

The Nordic financial electricity market

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THE NORDIC FINANCIAL ELECTRICITY MARKET

Nordic Energy Regulators
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Preface

NordREG is a cooperation of the Nordic energy regulators. The mission is to actively promote legal and institutional framework and conditions necessary for developing the Nordic and European electricity markets.

The financial market is an important market for market participants to mitigate their risks. By providing tools for risk management, the financial market contributes to the efficient functioning of both wholesale and end-user markets.

NordREG decided during 2009 to undertake a study on the Nordic financial electricity market. The aim of the report is to consider whether any improvements can be made to further increase the efficiency of the Nordic financial electricity market in order to secure an optimal price setting in the wholesale and the end-user markets.

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Summary

NordREG has found that the general view is that the Nordic financial electricity market functions well and has a good liquidity in the basic products. There is also a general consensus that there is trust in the market. The Nordic power market is often ranked highest in Europe regarding transparency and efficiency. The Nordic power market also has the highest turnover in exchange trading in relation to consumption in the area. The concerns that are raised by the market players are mainly related to the liquidity in contracts for difference – especially anticipating the coming division of Sweden into four bidding areas

There are certain traits in the Nordic financial market that contribute to its efficiency:

- The four Nordic countries function to a large degree as a common electricity market, with a substantial combined consumption which is the third largest market within EU after Germany and France,
- About 70 % of the consumption in the Nordic countries is traded day ahead on Nord Pool Spot. This gives a solid base to the reference price,
- The reference price is the system price, which is the price that would be the price if there were no congestions within the Nordic area,
- No physical delivery is required. The settlement of the financial market is totally financial.

The Nordic financial market is closely related to the Nordic wholesale market – good liquidity and reliable prices on the spot market contribute to liquidity in the financial market. Good possibilities for the market participants to hedge their positions contribute on the other hand to a willingness of players to trade on the spot market instead of taking long term physical positions bilaterally. Most players that have been interviewed during this project have concluded that the financial market meets their need for hedging. The liquidity provided by a number of financial players (speculators) shows that the market is important also for trading purposes.

The Nordic energy regulators and financial authorities have to develop a common understanding of the importance of the financial market as both a financial market and a part of the Nordic wholesale market, which is increasingly linked to the continental European electricity markets. The development of rules regarding cross border trade with electricity will increasingly affect the functioning of the Nordic electricity market as a whole – including the financial market. Therefore its important that regulators and other stakeholders base their decisions regarding the Nordic market on a deep understanding of also the whole European market and the consequences of changes in market design or underlying rules.

In this study NordREG has tried to describe and assess the efficiency of the Nordic financial electricity market. Data has been collected from Nord Pool ASA and Nasdaq OMX. Representatives from 13 market players were interviewed in the early stages of the study and towards the end a workshop was held with participation of market players and regulators, financial and competition authorities. Finally, earlier studies have been consulted and used as a background. NordREG has not had the intention to evaluate to what extent suggestions from earlier studies have been taken on board.

Due to availability of data, the data for the Nordic financial electricity market comprise in this study the forward trade on Nord Pool ASA and the OTC trade cleared by the clearing house Nasdaq OMX Commodities. A common assessment made by players is that this accounts for the majority of trade in standard forward products, maybe as much as 90 % of the trade in listed contracts. Still, it should be remembered that the actual forward market is not restricted to cleared trade. It is also possible to enter into non-standard contracts bilaterally or through brokers. The common view is that this non cleared trade is relatively limited, but since there is no reporting requirement there is no data.

One basic measure of liquidity is the traded volume. If we compare exchange trade in financial contracts plus cleared OTC in Nord Pool, EEX (Germany and France) and ENDEX (Netherlands, Belgium and UK) for 2009, Nord Pool has the largest turnover of about 2100 TWh, EEX 1025 TWh and ENDEX 120 TWh. The share of exchange trade compared to the total turnover is 56 % for Nord Pool, 28 % for EEX and 35 % for ENDEX respectively. This comparison shows that the Nord Pool exchange has a strong position in the Nordic forward trade. As mentioned before, according to players, the share of non-cleared trade in standard products is low in the Nordic countries, which contributes to a high level of transparency. Germany also has a high level of forward trade, but most if this trade is uncleared and thus less transparent.

The number of players on a market affects market concentration as well as liquidity. The number of players with Nord Pool agreements is around 400. About 86 % of the players have their legal base in the Nordic countries. Norway is still hosting the most players and 14 % of the players are located outside of the Nordic countries. Interviews have shown that there are different kinds of players, both fundamental players such as producers, suppliers and large customers, and international financial players like banks and trading companies.

Another measurement of an efficient market is the market concentration, the market share of large players. However, company-specific information is not public. To get an understanding of the market concentration on the Nordic financial market, NordREG has analyzed some other indicators of concentration: minimum number of companies needed to reach 50 % or 80 % of total volume and the combined market share of the five largest producers (Dong, E.ON, Fortum, Statkraft and Vattenfall).

The data analyzed for 2009 show that 12 companies were needed to reach 50 % of the volume and as much as 45 companies to reach 80 % of the volume. This must be regarded as a very good level of competition in a market. The share of total sell volume by the 5 leading producers was about 30 %.

Especially, the concentration of sellers of CfDs (contracts regarding the difference between a certain area price and the system price) has been mentioned as a concern. Are there other players than the leading producers providing CfDs and do they only provide them in their “home area”? The data for 2009 show that the leading producers provided about 70 % of the CfDs. This could be problematic if it reflects near monopolistic sell of CfDs. Therefore, data has been provided of different categories of sellers of CfDs. These data show that the sell by the dominant producers of CfDs in other areas than their dominant area has increased and in 2009 it exceeded the sale in “own” areas. In total, the sale of CfDs has increased and the sellers have broadened their supply.

There is also another sign that the CfD-market is more important than often perceived. If we look at the open interest in the end of the year, CfD-contracts have a much higher share of total open interest than of total turnover. Such contracts made up 30 % of the total open interest at year-end 2009 and 8 % of total turnover in 2009. This indicates an extensive hedging in CfD-contracts but small short-term trading in such contracts.

The total open interest (the sum of all open buy positions or all open sell positions with the clearing house) has increased over the years, both in terms of volume and Euros. Two explanations are probable for this – more hedging because of more developed risk management strategies and an increase in long-term trading positions.

Looking at the data more broadly, the analysis shows a solid development of the Nordic financial electricity market. However, there are years when several indicators of liquidity show a negative tendency. The first drop in 2003 is related to the Enron and TXU collapses while the recent financial crisis explains the second drop in 2009.

An important question is what will happen in the future. The Nordic players can and will increasingly trade in other relevant forward markets throughout Europe, such as markets that allow for cross commodity trading. Will the introduction of bidding areas in Sweden be met with a well functioning range of CfDs or will players increasingly choose area specific contracts? Will forward transmission rights be introduced between the Nordic areas and towards the continent and which will the consequences be for the Nordic financial market? Will it still be a common very liquid market with the system price as the reference price or will the market be fragmented into submarkets for different area specific contracts? In the end, Nordic regulators and other concerned authorities need to increase their understanding of the dynamic environment where the Nordic financial market operates.

1 Background

With a traded volume of around 70 percent of the Nordic consumption Nord Pools day ahead spot market plays an important role in the Nordic electricity market. This success rest among other on market participants confidence in the spot markets ability to fulfil their short and long term commitments and provide the basis for an efficient financial market where market participants can optimise their risks. These risks can be price risks, volume risks, price area risks, currency risks or risks associated with mismatches between a client's base demand and existing supply contracts.

Within the electricity sector there are different models to deal with these risks. In the Nordic electricity market hedging is mainly performed in the financial market. By providing tools for risk management, the financial market contributes to the efficient functioning of both wholesale and end-user markets. Implicit capacity auction or so called market splitting is used to allocate the transmission capacity in the Nordic day-ahead spot market. The listed derivatives at Nord Pool are traded with a reference price based on the system price in the Nordic day-ahead spot market. The financial market is as such a purely financial market where all contracts are traded and settled irrespective of transmission capacity.

It is stated in the Congestion Management Guidelines annexed to the regulation 1228/2003 EC "In regions where forward financial electricity markets are well developed and have shown their efficiency, all interconnection capacity may be allocated through implicit capacity auctioning." The efficiency and functioning of the Nordic forward finical market should as such be subject for evaluation and monitoring.

NordREG decided during 2009 to undertake a study on the Nordic financial electricity market. The aim of the report is to consider whether any improvements can be made to further increase the efficiency of the Nordic financial electricity market in order to secure an optimal price setting in the wholesale and the retail markets.

1.1 Terms of reference

In order to secure an optimal price setting in the wholesale retail markets, NordREG has decided to undertake a study to see whether any improvements can be made to further increase the efficiency of the Nordic financial electricity market.

The study will focus on:

1. Previous studies on the Nordic financial electricity market as well as other comparable markets
2. The number and type of actors on the Nordic financial electricity market in comparison with other European financial electricity markets.
3. The liquidity in the Nordic financial electricity market in comparison with other European financial electricity markets and other commodities markets.
4. Risk management
5. Particular features or structures in the Nordic electricity market that may prevent demanded financial instruments to be supplied?

1.2 The electricity market is an interaction between several markets

The Nordic electricity market consists of several markets which interact with each other.

The retail markets are to be regarded as national. However, NordREG is working together with other stakeholders to create a common Nordic retail market for electricity by the year 2015. A public consultation concerning this issue was issued on the 30 of July this year.

The day ahead spot market organized by Nord Pool Spot represent the core of the wholesale market. At 12.00 each day orders for each physical hourly the next day are matched based on an implicit auction. The matched volume corresponds to about 70 % of the total Nordic consumption of electricity. The auction is performed for all the Nordic countries simultaneously, but the market is divided into different bidding areas. Congestions between areas can result in different area prices. Nord Pool Spot also calculates a Nordic system price for each hour. The system price states the common Nordic price that would have been achieved with no congestion.

There is no requirement on retailers and producers to trade in the spot market. They also have the option to enter into bilateral physical contracts. Bilateral contracts can be tailor-made regarding e.g. contract period, allowed volume deviations and price clauses. A bilateral contract can be valid for a specific hour or be very long-term. It can be a fixed volume or all the volume of a retailer or a producer. The price can be fixed or related to spot prices or other indices. It should be noted that all transmission capacity between bidding areas is handled through the spot market.

Depending on the terms in their physical contracts the market players can be exposed to different risks. The demand for financial hedges from a market player varies with its overall risk exposure and with the terms in its physical contracts.

A fixed-price retail contract will i.e. transfer the price risk from the customer to the retailer. The retailer can choose to manage the price risk via a fixed-price bilateral contract with a producer. Another possibility is to buy the physical electricity in the spot market and to combine the spot purchase with a separate financial hedge of the price risk. In the same way a producer has the possibility to reduce the price risk either via fixed-price bilateral contracts or via sales to the spot market combined with separate financial hedges. For large customers the choice is not only between variable-price or fixed-price retail contracts. They can also choose to combine with financial hedges if they buy in the spot market or if they have variable-price retail contracts. Financial hedges and spot purchases can be done directly by the customer or with assistance of a portfolio administrator. Retailers and producers can of course also choose to use portfolio administrators.

Financial hedges are done in the financial market. Nord Pool ASA organizes an exchange for trade in standardized power derivatives. Alternatively power derivatives could be bought and sold in the OTC market with the assistance of brokers. Trading can also be done bilaterally between a buyer and a seller. Trading in the OTC market and bilateral trade can be cleared at Nord Pool Clearing if the traded instruments are exchange-listed

products. Nord Pool Clearing only settles exchange-listed products, non listed contracts could be cleared at NOS clearing.

In most financial commodity markets there is a physical delivery during the delivery period. Physical delivery of a commodity contract implies that the market player has to arrange a physical receipt or delivery in a defined point or storage if the contract is not closed out before the delivery period.

In the Nordic financial electricity market however there is no such physical delivery. Instead contracts are settled financially during the delivery period. A general acceptance of a purely financial settlement requires that market players place their trust in the formation of the reference price. The Nordic system price is the reference price for most of the contracts in the Nordic financial electricity market. As stated above, the daily trade at Nord Pools spot market represent about 70 percent of the Nordic consumption which gives a solid base to the reference price.

The liquidity in the financial commodity markets is normally created both by fundamental players and traders. Fundamental players need financial hedges in order to reduce their risk exposure, while traders invest in trading positions with the purpose of earning profits. The liquidity offered from traders is a necessary lubricant for the financial market in order for fundamental market players to efficiently manage their risk. Hedgers and traders have thus different driving forces for their trade and different needs and strategies for their risk management. Banks play a special role. They facilitate opportunities for customers to take hedging or trading positions and they develop a distribution channel for the financial market. Further more by engaging in proprietary trading and trade on their own book they provide liquidity and new opportunities to the market.

There are several sources of volatility connected to the electricity prices. Variations in demand in relation to constraints in the transmission network including interconnectors and the availability of production capacity create hourly and seasonally price variation. Demand will vary both with temperature and the general industrial activity in the Nordic countries while available production capacity, with more than half of the capacity in the Nordic market related to hydro, will depend on the seasonal rainfall. The price of electricity is also linked to the prices of oil, coal and natural gas and the availability of large productions plants like nuclear plants.

An efficient financial electricity market both for the short term and long term is thus important for the functioning of both the wholesale and the end-user markets in the Nordic countries.

1.3 Towards a European electricity market

In most other European countries a larger part of the consumption is traded bilaterally often in long-term physical supply contracts. The role of the spot market in these markets is to balance the positions of market participants before delivery. In such markets, forward transmission rights are important – a physical contract requires ensured physical delivery. As implicit day-ahead auctions increase throughout Europe, the possibility arises to develop long term markets in the direction of financial forward markets.

The Nordic electricity market is increasingly connected to the continental markets. Through the implementation of the third inner market package, which will be in force by March 2011, the development towards an inner European market for electricity is strengthened. Important projects with relevance for the Nordic electricity market are going on in cooperation between the EU Commission, and the organisations of the national energy regulators (ERGEG) and from March 2011 ACER, and system operators (ENTSO-E). The top priority in this work is to develop day ahead market coupling across Europe. In November 2010, a market coupling solution will be launched connecting the Nordic market to the French, Belgian, Dutch and German markets, with the NorNED cable coming into the market coupling in mid December. This is an interim solution which will be further developed into a single price coupling model. In order to reach this goal, market design will need to adapt in all affected countries.

The development towards an inner market is supported by the development of Framework Guidelines developed by ERGEG/ACER, and Network Codes developed by ENTSO-E. In the end, these Network Codes will be made legally binding. Framework guidelines and Network Codes will be developed in all areas of importance for cross border trade with electricity, such as capacity calculation and capacity allocation, operational security, cross border balancing and so on.

Legally binding guidelines for transparency are also being developed in a two tier process, where fundamental data transparency is one tier and the integrity and transparency of traded wholesale markets for electricity and gas is the other.

The goal to substantially increase the share of renewables across Europe will change the structure of the infrastructure, leading to a need to build new transmission lines as well as the need to adapt market models to intermittent generation patterns.

One issue that is widely discussed in the European fora, is the size of bidding zones. Will the decision to divide Sweden into four bidding areas lead to a similar development in other European countries, where internal congestion exists? Forward transmission rights is an important issue in most European countries, and some players request financial transmission rights to be introduced between all Nordic bidding areas.

All these changes will affect the Nordic electricity market and the Nordic financial electricity market. The Nordic market players can and will increasingly trade in other relevant forward markets throughout Europe, such as markets that allow for cross commodity trading. Will the introduction of bidding areas in Sweden be met with a well functioning range of CfDs or will players increasingly choose area specific contracts? Will forward transmission rights be introduced between the Nordic areas and towards the continent and which will the consequences be for the Nordic financial market? Will it still be a common very liquid market with the system price as the reference price or will the market be fragmented into submarkets for different area specific contracts? In the end, Nordic regulators and other concerned authorities need to increase their understanding of the dynamic environment where the Nordic financial market operates.

2 Method

A taskforce within NordREG was formed, consisting of one or two representatives from each Nordic country. Furthermore, consultant Björn Hagman from Hagman Energy has contributed to the work.

The performance of the Nordic electricity market is dependent on an efficient interaction between the physical and the financial market. Therefore the assessment of the financial market in this report is focused on the functioning of the financial market and its relation to an efficient and well-functioning Nordic electricity market. The focus is neither on how well the requirements in the licences for the exchange and the clearing house are fulfilled, nor on the performance in relation to the market abuse directive (MAD) or the directive on markets in financial instruments (MIFID). It is the task of the Nordic financial authorities to perform such supervision. Transparency, record keeping and settlement issues in the financial electricity market are not dealt with specifically within this task.

To establish a platform on which to evaluate the performance of the financial market NordREG has; reviewed earlier studies related to this issue, gathered and analysed data from Nord Pool ASA and Nasdaq OMX Commodities and interviewed some of the participants of the Nordic electricity market.

The interviews dealt with questions regarding risk management and the functioning of the Nordic financial market. The interviewees were given the opportunity to read through the gathered information and give input. The following market participants have been interviewed:

- Barclays Capital
- E-CO Vannkraft
- Energiakolmio
- EnergiMidt Handel
- E.ON Energy Trading
- FSE Foreningen for Slutbrugere af Energi
- Helsingin Energia
- Nordjysk Elhandel
- Oberoende elhandlare
- Scandem
- SEB
- Skellefteå Kraft
- Stora Enso

The taskforce has arranged a workshop to gather further input and receive comments from relevant stakeholders. In order to collect any additional comments, the report will be sent out for public consultation after its publication.

2.1 Criteria for an efficient and well-functioning market

The need of a financial commodity market is related to the price variation in the underlying asset. When the underlying prices are volatile, the demand for price hedging

increases. Producers, suppliers and consumers can optimize their risks associated with variations in price in coming months and years by selling or buying future contracts based on the underlying asset to an already decided price.

The efficiency of an *organized* financial market will normally be represented by the size of the traded volume of the underlying asset in relation to the acceptability of standardized contracts. A liquid market place where trade in standardized contracts is easy has the potential to lower transaction costs and open up for a more frequent trade, increasing economies of scale. Still, broker-assisted OTC trade in non-standard derivatives is an essential complement to the trade in standardized contracts. Furthermore, the availability of a clearing service is important to reduce counter party risk.

In the following, we will introduce some criteria or indicators that can be attributed to an efficient financial market.

2.1.1 Market concentration

A requirement for a well-functioning and efficient market is that there are many sellers and buyers. If the market is too concentrated some sellers have a larger impact on total market supply and create opportunities to exercise market power to influence the price. The potential for market power is determined, among other things by the market concentration and liquidity. There is a trade off between concentration and liquidity. If the market is too dispersed, the liquidity might fall and as such reduce efficiency. When the concentration on a market is studied the concept of the relevant market is important. A relevant market is defined according to both product and geographic factors.

2.1.2 Information

The preconditions for efficient market functioning have been discussed for decades. A well known seminal paper on this subject is “Efficient capital market”¹ written by Eugene Fama in the 1970. He argues that “a market in which prices always “fully reflect” available information can be called “efficient””. The price in an efficient market should provide accurate signals for correct resource allocation. Access to relevant market information is therefore the most essential factor for an efficient market.

Theoretically one can view market efficiency in three levels, weak, semi-strong and strong. This is often referred to as the Efficient Market Hypothesis (EMH)

1. **The weak form** – All historic information is incorporated in the price. If a market is efficient in the weak sense, it is impossible to make consistently superior profits by studying past returns.
2. **The semi-strong form** – All historic and publicly available information is incorporated in the price. If a market is efficient in the semi-strong sense, the price will adjust immediately to public information.
3. **The strong form** – All relevant information is incorporated in the price. If the market is efficient in the strong sense, it is very hard to outperform the market.

The efficiency of a financial market depends both on the availability of information and the ability to incorporate information into the market price. If information only is

¹ Fama Eugene....

available to a few market participants this could create an imbalance of power in the transactions as one party would have a greater knowledge than the other parties.

Market efficiency can be measured by how quickly and completely prices adjust to new information.

2.1.3 Liquidity

Liquidity is an important element of an efficient financial market. Liquidity can be defined as the degree to which an asset can be bought and sold in the market without affecting the price of the asset and without incurring significant transaction costs.

The size of the liquidity in a market has a great impact on risk management, transaction costs and the value of the derivatives. Liquidity can be measured by studying the volume of trades in the market, the bid-offer spread, number of trades, the range of products available to market participants and the number of market participants.

The spread in a derivative is normally associated with transaction cost since it indirectly represent a cost for buying and selling. The spread in a liquid derivative should be fairly small. A small spread implies that there is a common view of the “correct” price.

The price setting of the derivatives becomes more trustworthy in a market with high level of trading activities. A high level of trading activity does not only reduce the spread but also the risk for great price movements when bigger trades are done.

A financial market with different types of derivatives gives the market participants better opportunity to find the best suitable risk strategy. A wide range of different derivatives could therefore be an indication of a liquid market.

Different types of market participants are also essential for creating a liquid market. IN particular speculators have an important role making sure that prices adjust very quickly to new information. Speculators buy when prices are too low and help lifting these prices, and sell when prices are too high, thus helping to lower these prices. A higher frequency of trade reduces the spread and creates thus a more efficient market.

2.1.4 Confidence

Confidence in the market is a key in factor for an efficient market. The market participants must believe that the spot market is functioning and that the price setting is correct. The trade in the financial market will be negatively affected if the price setting in the underlying asset (the system price) is incorrect since this increases the risk of an incorrect price formation in the future.

Confidence in the market also depends on the availability of information, long-term and stable rules and a similar legal framework for those market participants that are engaged in cross border trade. A harmonised legal framework could be an important driver of the development of competition common market. An efficient supervision of the financial markets is also of importance in order to increase the confidence in the market.

3 Exchange trade and cleared OTC trade in the Nordic market

Based on available data we present a number of diagrams which describe the development of various indicators. Together these indicators provide a picture of the development in the Nordic financial electricity market.

3.1 Exchange and clearing house development

Nord Pool started in 1993 as a power exchange for Norway. In 1996, the exchange area was widened to include also Sweden. Finland followed in 1998, Western Denmark followed in 1999 and Eastern Denmark in 2000.

The new market was built on a long Nordic tradition of power trading, both within and between the countries. The driving force for the trade was the different production structures among the producers and the common aim was to get a cost-effective use of the existing production resources in the Nordic countries. The production in Norway, North Sweden and North Finland is almost entirely hydro power while the production in the rest of the Nordic area is mostly nuclear power and thermal power.

At the beginning Nord Pool organised only a physical day-ahead market. Soon thereafter a financial market with clearing services was introduced.

Nord Pool's clearing services were after some years also made available for OTC trade and bilateral trade in exchange-listed contracts. The Nord Pool product development has meant that exchange-listed contracts now also include options, CfD-contracts regarding price area differences, peak-load contracts and year contracts up to five years after the current year. However, there are in the OTC market and in the bilateral market still financial contracts that are not possible to clear since they are not exchange-listed. Examples of such contracts are contracts in NOK or SEK, area price contracts and structured contracts with e.g. special volume profile in order to reduce the volume risk. The turnover in such contracts is not possible to estimate since there are no report requirements for such trade.

The data we present for the Nordic financial electricity market include only cleared trade, i.e. exchange trade, cleared OTC trade and cleared bilateral trade. Cleared OTC will in the following of this report be used as a common term for both cleared OTC trade and cleared bilateral trade. The data do not include OTC trade and bilateral trade in contracts that are not reported for clearing since there is no transparency and no report requirements for such trade. The interviews with market players indicate that for financial contracts that are not exchange-listed and thus not possible to clear have the trade rather decreased than increased during the last years. Guesses from interviewed market players indicate that at least 90 % of the OTC trade in exchange-listed contracts is reported for clearing. Many companies have in their risk management policies that all contracts that can be cleared shall be cleared.

The following sections in this chapter describe data for the market organized by Nord Pool. Imarex started in 2000 as a freight derivatives market. NordREG has tried to get a picture of the trade of Nordic power contracts in the the Imarex groups platform,

including products settled at NOS Clearing. Section 3.8 in this chapter describes an overall picture of the trade and settlement on these platforms.

3.2 Liquidity development

Financial trade through Nord Pool expanded rapidly during the first years. In 1998 financial trade amounted to 89 TWh while 373 TWh was cleared in OTC and bilateral contracts. The development of yearly volumes since 1998 is shown in figure 1. The source for the figures and tables in this section is data provided by Nord Pool and Nasdaq OMX Commodities. The total volume in exchange trade and cleared OTC trade corresponded in 2008 to about 6 times and in 2009 to about 5 times the Nordic electricity consumption. If physical trade in day-ahead and intraday markets are added together with guesses of non-cleared financial trade, the churn in the Nordic electricity market was about 6-7 in 2009 and 7-8 in 2008. Measures of the churn in European electricity markets include both all financial trade and all physical trade.

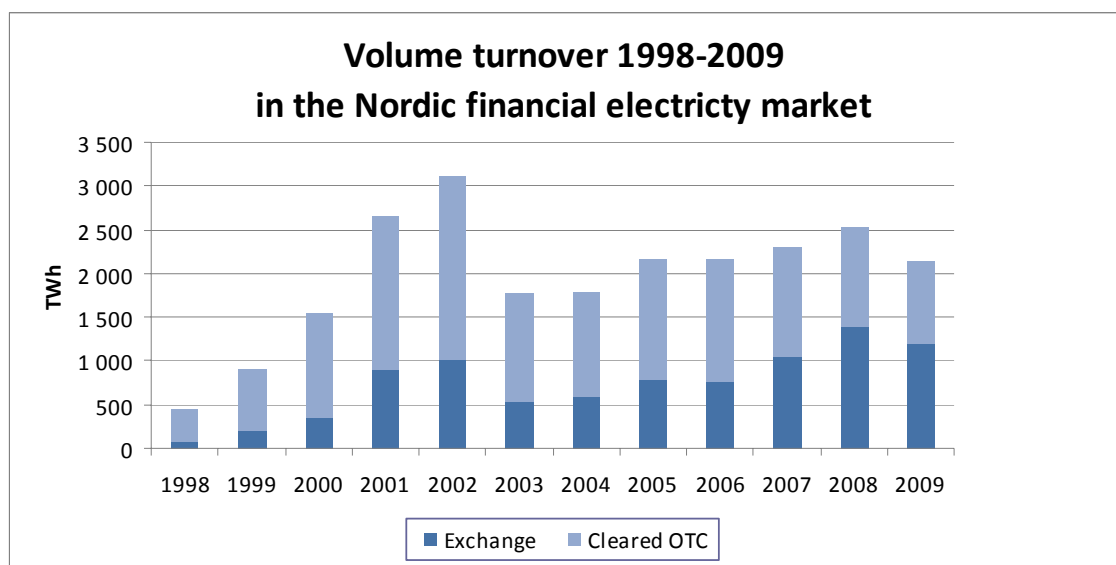


Figure 1: Volume turnover in the Nordic financial electricity market

The figure shows that the rapid expansion continued until 2002. One driver for the increased turnover was the geographic expansion to all Nordic countries. Another driver was the dynamic development of the new electricity market. Producers, customers, retailers, portfolio administrators and traders developed new business strategies which resulted in increased hedging and trading in the financial market.

A main contributor to the expansion 1998-2002 was also the inflow of US energy companies to the Nordic financial electricity market. Nearly all major US power companies started trading operations in the Nordic market. It became essential for US power companies to have international trading operations since such operations resulted in an increased valuation of the company in the US stock market. However, the collapse of Enron in the end of 2001 and the collapse of TXU Europe in the end of 2002 changed drastically the view in the US stock market. Power companies with international trading operations got sharp reductions in the stock prices and it was essential for them to cease their international operations. The exodus of most US power companies in 2003 resulted

in a sharp reduction of the turnover in the Nordic financial market. It resulted also in a sharp reduction of the turnover in the UK financial electricity market.

The turnover in the Nordic financial market grew thereafter gradually in the period 2003-2008. One explanation is that the continued development of business strategies by producers, customers, retailers, portfolio administrators and traders has resulted in increased hedging and trading in the financial market. Another explanation is that European power companies and international banks have expanded their activities in the Nordic financial market.

The main explanation for the reduction in 2009 is probably the financial crisis. Many companies had to or strived to reduce their balance sheets. The reductions were probably more profound regarding trade positions than regarding hedge positions. However, many industrial customers had to reduce their production and the consequence was lower forecasted electricity consumption and lower hedging need. The capital market was in the beginning of 2010 not so strained as one year ago. This is probably one explanation why the total clearing turnover increased from 585 TWh in January-March 2009 to 688 TWh in January-March 2010.

The long-term increase in turnover has been higher for exchange trade than for OTC trade. The market share for exchange trade in relation to total cleared trade has grown from 19 % in 1998 to 31 % in 2003 and 56 % in 2009. The lowered share for OTC trade of total cleared trade is not caused by a bigger reluctance to report OTC trade for clearing. On the contrary, the message from many market players is that they now clear all trades that are possible to clear (all trades in exchange-listed contracts). Some guess that at least 90 % of the OTC trade in exchange-listed contracts is reported for clearing. This figure is not possible to verify since there is no transparency in OTC trade that is not reported for clearing.

The development of turnover in millions of euro since 1998 is shown in figure 2.

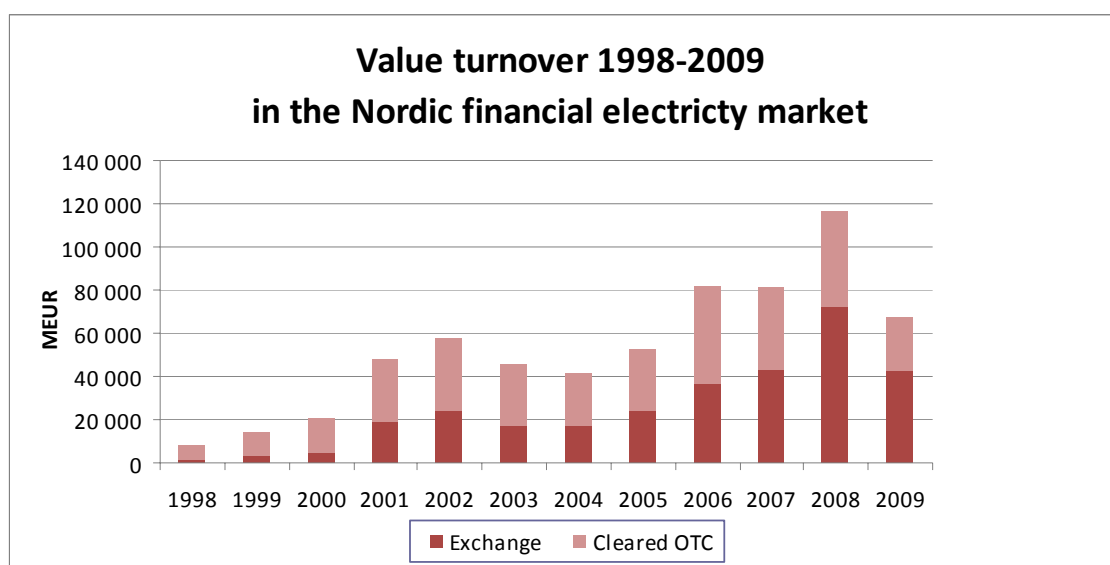


Figure 2: Value turnover in the Nordic financial electricity market

The turnover in MEUR has of course had much of the same development as the turnover in TWh. However, there are some interesting differences.

The increase in value has been much stronger than the increase in volume. The turnover in total value was e.g. double as high in 2008 as in 2002 while the turnover in total volume was 20 % lower in 2008 compared to 2002. The explanation is that the electricity prices are much higher now (see section 3.3). The total turnover in the Nordic financial electricity market was in 2008 about 10 % of the size of the total Nordic gross domestic product. The daily average in total turnover was nearly 500 million euro per trading day in 2008.

Another measure of the liquidity development in a financial market is how the number of transactions has developed. Figure 3 shows the development since 2003 of the number of transactions.

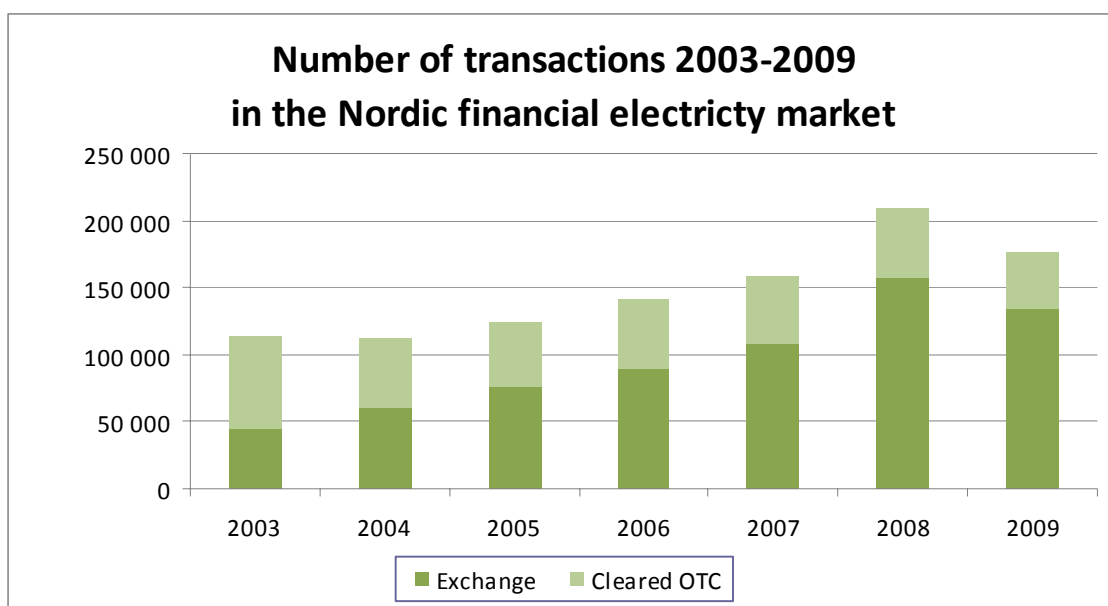


Figure 3: Number of transactions in the Nordic financial electricity market

The number of transactions has since 2003 had the same general development as the turnover in TWh or MEUR. The total number has increased from less than 500 transactions per trading day in 2003 and 2004 to about 800 transactions per trading day in 2008 and about 700 transactions per trading day in 2009. However, there are some interesting differences. Figure 4 shows how the average turnover (GWh) per transaction has developed since 2003 for exchange trade and cleared OTC trade.

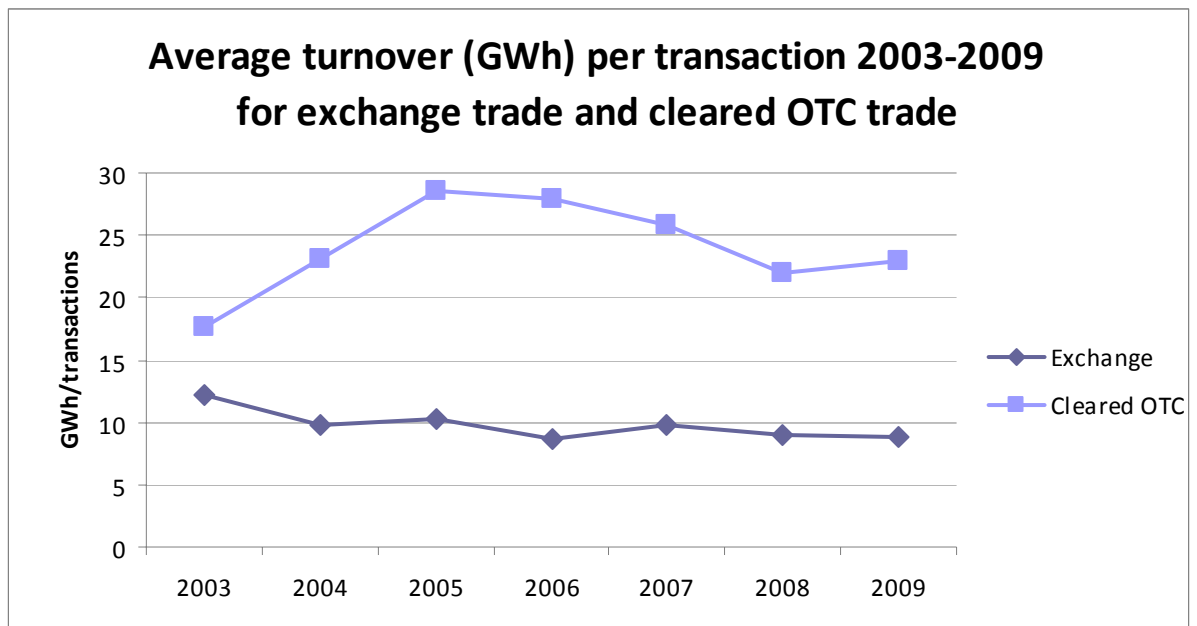


Figure 4: Average turnover (MWh) per transaction for exchange trade and cleared OTC trade 2003-2009 in the Nordic financial electricity market

It can be seen that there is stability in the average turnover during 2003-2009 for exchange trade and OTC trade. There is a trend to slightly smaller transactions for exchange trade. The average OTC transaction rose between 2003 and 2005 and has thereafter decreased.

More important, the figure shows that the average transaction is considerable lower for exchange trade than for OTC trade. This indicates that the exchange has a higher market share for smaller trades than for bigger trades. There are at least two possible explanations. The first is that the exchange trade has a higher market share for products with shorter duration (days, weeks and months) while the OTC trade has a higher market share for products with longer duration (quarters and years). The second possible explanation is that the exchange has a higher market share among market players with smaller trades than among market players with bigger trades. Both explanations are probably true. It is more profitable to be a broker for a bigger contract than for a smaller. It is also probably more easy for a broker to find trade interest if it calls a bigger market player than a smaller market player.

3.3 Price development

The following figure shows how the Nord Pool price for the financial contract regarding base-load next calendar year has varied since 2003. The contract in the figure is during 2003 the base-load contract for 2004, during 2004 the base-load contract for 2005 and so on. The figure includes also how the EEX price for base-load next calendar year has varied since 2003 when EEX started its trade in financial contracts.

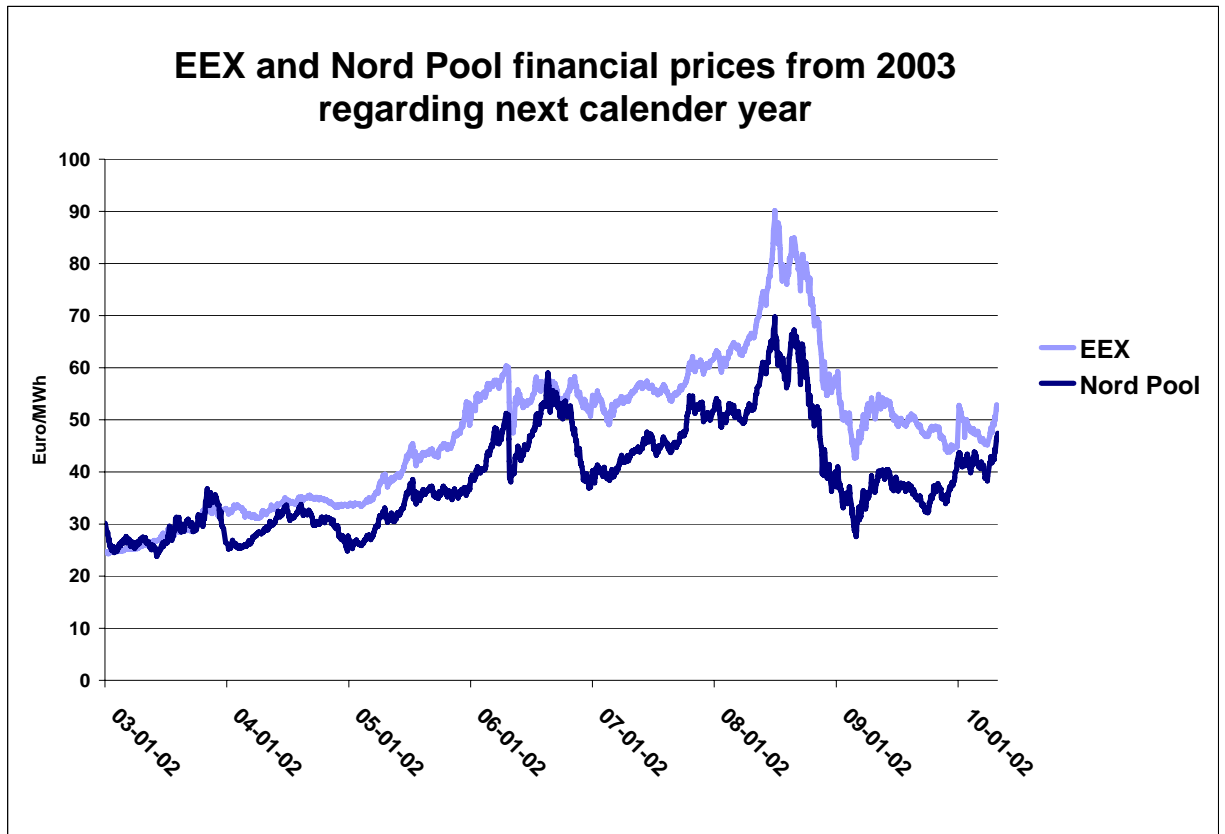


Figure 5: EEX and Nord Pool prices base-load next calendar year

The figure shows big variations in the prices for the next calendar year. However, the Nord Pool price and the EEX price vary much the same. The explanation for the increase in prices during 2005 was the increase in the price for CO₂ emission rights. The sharp fall during the end of April 2006 was because of the sharp fall in CO₂ prices. The high prices during 2008 were because of the high fuel prices.

The difference between Nord Pool and EEX prices varies also but these variations are much smaller. The maximum difference (about 20 EUR/MWh) was in 2008 when the fuel prices were very high and the Continental prices were expected to become very high. During 2003 and the autumn 2006 was the price for next calendar year sometimes lower on EEX than on Nord Pool because of the strained hydro situation during these periods. The present Nordic hydro situation is also very strained and the difference between EEX and Nord Pool prices has narrowed. The financial market expects the Nordic hydro situation to be more normalized until 2011 but not totally normalized. The Nord Pool prices for 2012 and 2013 are lower than the price for 2011.

The following figure shows how the weekly averages of spot prices have varied since 2001 in the Nordic area (Nord Pool) and the German area (EEX).

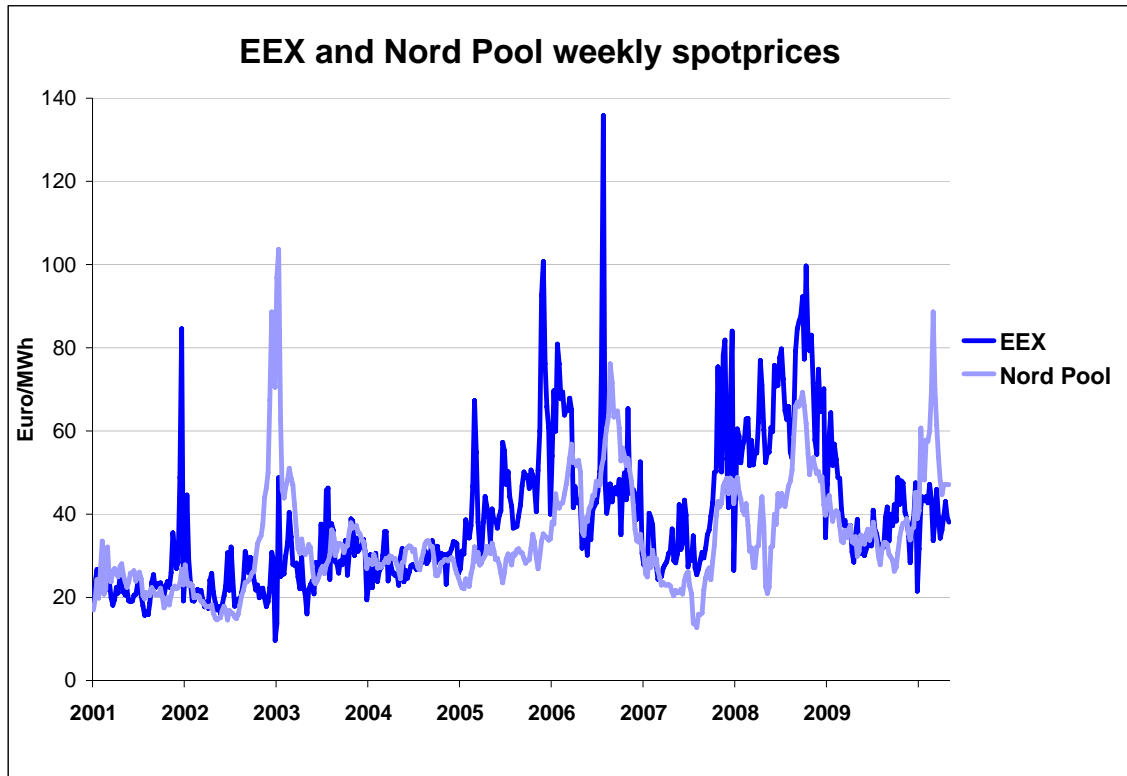


Figure 6: EEX and Nord Pool weekly averages of spot prices

The figure shows very extensive variations in the weekly averages of spot prices. It shows also very extensive variations in the differences between Nordic and German spot prices. The Nordic peaks in the winter 2002/2003 and the autumn 2006 were caused by a strained hydro situation. The Nordic peak in the autumn 2008 was caused by nuclear problems in Sweden and high fuel prices. The Nordic peak in the winter 2009/10 was caused by nuclear problems in Sweden, cold weather and a strained hydro situation. There is a correlation between the variations in spot prices and the variations in financial prices for the next calendar year but the correlation is of course much higher between the variations in spot prices and the variations in financial prices for the next weeks and the next months.

3.4 Development of open interest

The clearing house becomes the counterparty to both the buyer and the seller once a trade is done on the exchange or once an OTC trade is registered for clearing. Therefore a market player who trades on the exchange has to have an agreement with both the exchange and with the clearing house. NASDAQ OMX Stockholm AB is now the clearing house for the trade on the Nord Pool exchange and has taken over this role from Nord Pool Clearing ASA.

The clearing house nets (offsets) the portfolio of positions a market player has entered into regarding each contract. The net position of the market player regarding a certain contract is its open position with the clearing house. A short-term trading company normally has small open positions in relation to its total trading. A trading company which takes long-term positions can have bigger open positions with the clearing house in

relation to its total trading. A producer or a customer who performs multi-year hedges can even have a bigger open position than its trade during the year.

The sum of all open buy positions (or all open sell positions) with the clearing house is the open interest of the clearing house. The net sum of all open positions with the clearing house is zero since the clearing house always becomes the counterparty to both the buyer and the seller. The development of open interest (TWh and MEUR) at year-end 1998-2009 is shown in the following figure.

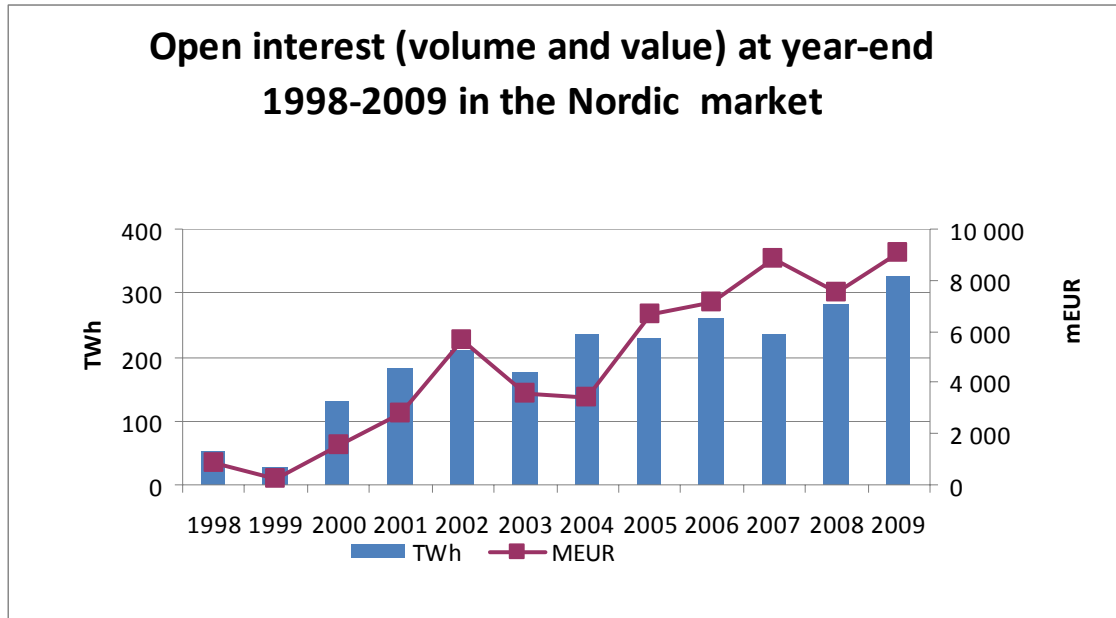


Figure 7: Open interest (TWh and MEUR) at year-end

The scales in the figure for TWh and MEUR have been chosen in order to get the same height for both the TWh volume and the MEUR value for 2009. 2007 had the highest financial prices at year-end. The MEUR value at year-end 2007 is therefore relatively higher than the TWh volume. The lower financial prices at year-end for most of the years 1998-2004 (except 2002 with the strained hydro situation) resulted on the other hand in relatively lower MEUR values than TWh volumes. The financial prices at year-end 2008 were relatively low although the financial prices were very high in average during 2008.

The yearly changes in MEUR value are different from the yearly changes in TWh volume because of the variations in financial prices. The increase in open interest during the whole period 1998-2009 is higher for the MEUR value than the TWh volume. However, during the last three years there has been a strong increase in TWh volume although the MEUR value is rather stable.

A comparison with figure 1 and figure 2 shows that the increase in open interest has been stronger than the increase in turnover. This is true both for the increase in volume (TWh) and the increase in value (MEUR). 2002 was the year with the highest total clearing volume but the open interest volume was 53 % higher in 2009 than in 2002. The total cleared value was 16 % higher in 2009 than in 2002 but the total open interest value was 61 % higher in 2009 than in 2002.

There are two possible explanations for the stronger increase in open interest than the increase in turnover. One possible explanation is an increased hedging because of more developed risk management by producers, customers and retailers. The other possible explanation is an increase in long-term trading positions. Both explanations are probably true and contributing to the stronger increase in open interest than the increase in turnover.

3.5 Product structure

Nord Pool's original product structure consisted of base-load contracts regarding weeks, blocks (4-week periods), seasons (three multi-week periods during the year) and years. Blocks and seasons have ceased and months and quarters have been introduced. Day contracts and further year contracts have been added. It is now possible to trade financial contracts for the next day up to 5 years after the current year. The year contracts cascade into quarter contracts before delivery and the quarter contracts cascade into month contracts before delivery.

All financial contracts are settled financially. The settlement is done with the clearing house. There is no physical delivery of electric power. The reference price for the settlement is the system price. The system price is calculated by Nord Pool Spot and states the common Nordic price that would have been achieved with only one bidding area for the whole Nordic area.

Option contracts were introduced in 1999. Both European-style options and Asian-style options were listed in the beginning but the listing of Asian-style options ceased after a period because of low demand. The underlying contracts are now the two nearest quarters and the two nearest calendar years. European-style means that the option contracts can only be exercised at the defined exercise day.

CfD-contracts were introduced in 2000. A CfD-contract is a contract regarding the difference between a certain area price and the system price. It is now possible to trade CfD-contracts regarding Copenhagen (Eastern Denmark), Århus (Western Denmark), Helsinki (Finland), Stockholm (Sweden) and Oslo (South-Eastern Norway). There are CfD-contracts for months, quarters and the three nearest calendar years.

Peak-load contracts were introduced in 2007. The peak-load is defined as Monday to Friday 08.00 to 20.00 (60 hours per week). There are peak-load contracts for months, quarters and the nearest year. The turnover in peak-load contracts has so far been negligible.

Nord Pool contracts have traditionally been in NOK. It was decided in 2002 to change to EUR for all new contracts with delivery periods in 2006 or later.

The following figure shows the percentage of total turnover (TWh) for different product categories.

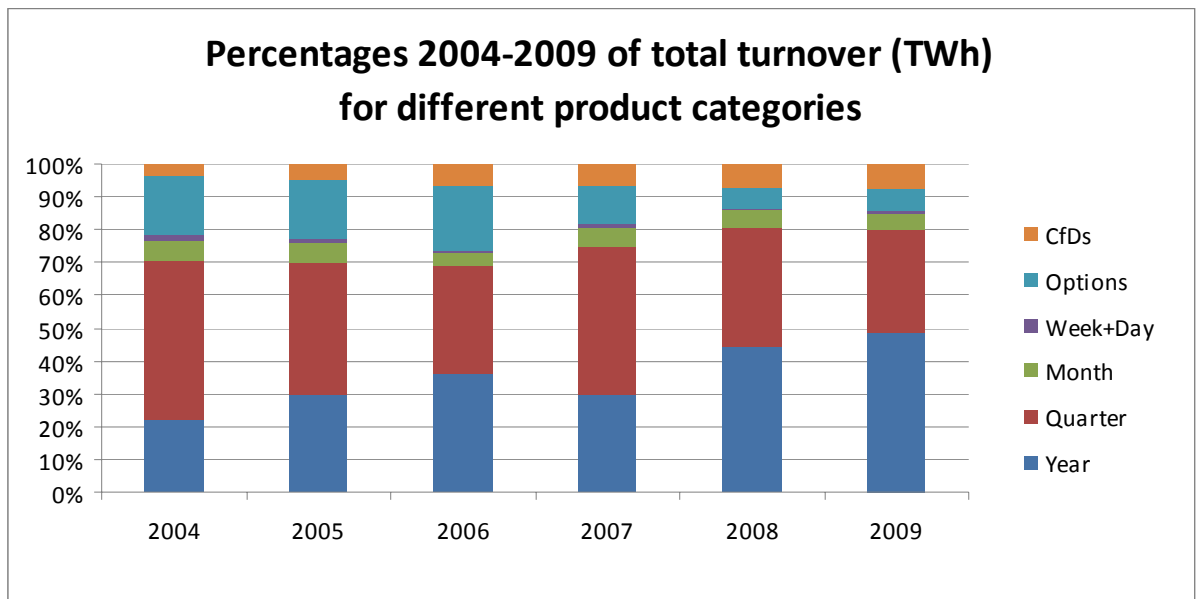


Figure 8: Percentages of total turnover (TWh) for different product categories

The figure shows large changes in the turnover shares for different product categories. The share of year contracts more than doubles from 22 % in 2004 to 48 % in 2009. The share of CfD-contracts doubles from 4 % in 2004 to 8 % in 2009. The share of option contracts falls to only one third of the share in 2004 (from 18 % in 2004 to 6 % in 2009). The share of quarter contracts is reduced with one third from 48 % in 2004 to 32 % in 2009. The share of short-term contracts (months, weeks and days) is reduced from 8 % in 2004 to 6 % in 2009.

These changes in shares for different product categories indicate three major movements in the Nordic financial electricity market.

The first is that there is a movement from shorter contracts to year contracts. One reason for this is probably that producers, customers and retailers perform more long-term hedging than before. Another reason can be that international traders are more focused on other factors than hydrological development and therefore prefer trading in year contracts. The hydrological development affects the price development of year contracts much less than it affects the price development of more short-term products.

The second movement is increased area price risk management which can be seen in the doubled share of CfD-contracts. The interviews show that area price risk management has become a much more important part of risk management strategies, especially for retailers in Denmark, Finland and Sweden but also for customers in these countries. The Norwegian interest in CfD-contracts has so far been much smaller than the interest in the other three countries.

The third movement is decreased use of option contracts for hedging. The interviews show that the volatility during the latest years has increased option premiums to levels that make options difficult to use for other purposes than trading purposes.

The following figure shows the percentage of total open interest (TWh) for different product categories.

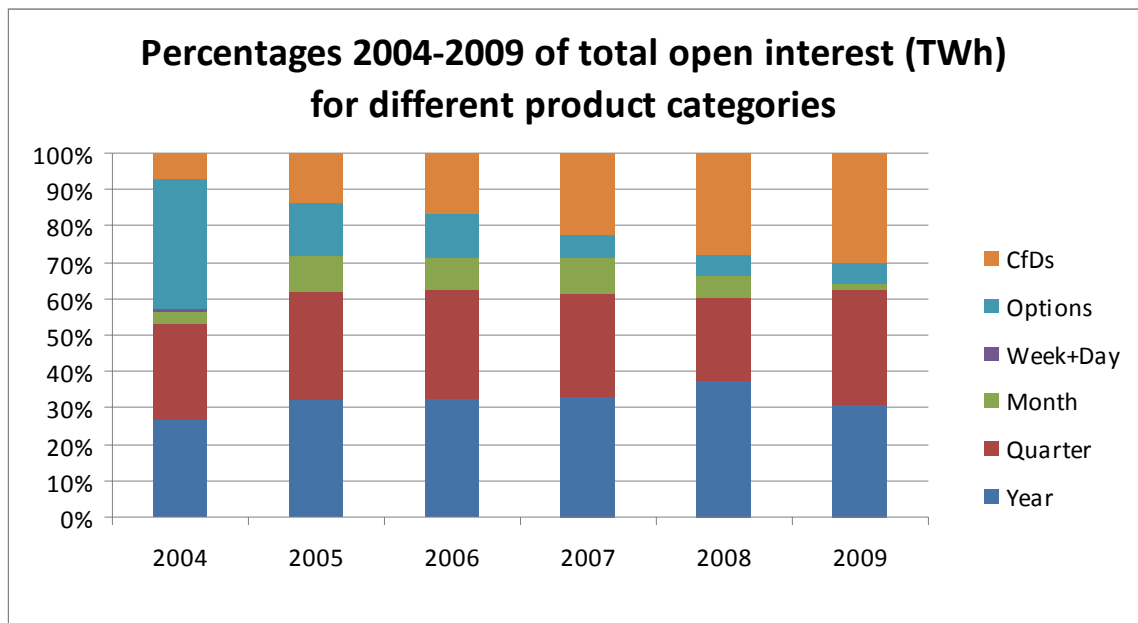


Figure 9: Percentages at year-end of total open interest (TWh) for different product categories

NOTE: The contract for the next year is at year-end cascaded into quarter contracts. This means that e.g. the year contract for 2010 is a major part of the turnover of year contracts in 2009 but the open interest in such contracts is at year-end 2009 included in the open interest in quarter contracts.

Also this figure shows large changes in the shares for different product categories. The share of CfD-contracts quadruples from 7 % in 2004 to 30 % in 2009. The share of option contracts falls to only one seventh of the share in 2004 (from 36 % in 2004 to 5 % in 2009). However, the share of year contracts has only a small increase from 27 % in 2004 to 31 % in 2009. It is interesting to note that the share of year contracts was higher in 2008 (37 %) than in 2009. The share of quarter contracts has the opposite movement as year contracts. It is reduced from 27 % in 2004 to 23 % in 2008 and increases thereafter to 32 % in 2009.

A higher percentage in figure 9 than in figure 8 indicates that much of the turnover in the product category is hedging or long-term trading. A lower percentage in figure 9 than in figure 8 indicates on the other hand that much of the turnover in the product category is short-term trading.

CfD-contracts have a much higher share of total open interest than of total turnover. Such contracts made up 30 % of the total open interest at year-end 2009 and 8 % of the total turnover in 2009. This indicates an extensive hedging in CfD-contracts and small short-term trading in such contracts.

A comparison of figure 8 and 9 also reveals an interesting development for option contracts. In 2004 such contracts had a much higher share of total open interest than of total turnover. This indicates an extensive hedging and long-term trading in option contracts at that time. In 2009 is the situation opposite for option contracts with a higher share of total turnover than of total open interest. This supports the view in some

interviews that options have become difficult to use for other purposes than trading purposes.

The difference between figure 8 and 9 for year and quarter contracts is more statistical. The contract for the next year is at year-end cascaded into quarter contracts. This means that e.g. the year contract for 2010 is a major part of the turnover of year contracts in 2009 but the open interest in the contract is at year-end included in the open interest of quarter contracts since the contract at year-end has been cascaded into quarter contracts. The share 31 % for year contracts at year-end 2009 means thus that the year contracts for 2011-2014 made up 31 % of the total open interest at year-end 2009.

The interesting conclusion of figure 9 is consequently that the open interest volume at year-end 2009 was split in three equal parts besides 5 % in option contracts. These three equal parts were system price contracts regarding 2010, system price contracts regarding 2011-2014 and CfD-contracts.

3.6 Market players

There are currently 134 market players who have membership agreements with the Nord Pool exchange and the clearing house regarding power contracts. Beyond this 244 market players have clearing client agreements with the clearing house and are represented by a client representative. In addition, there are also 11 entities with a broker agreement with the clearing house for reporting of power transactions for clearing. Compared to the end of 2000, the number of members has increased from 113 to 134 and the number of clearing clients has increased from 147 to 244.

The following figure shows how the number of market players with Nord Pool agreements regarding power contracts has developed.

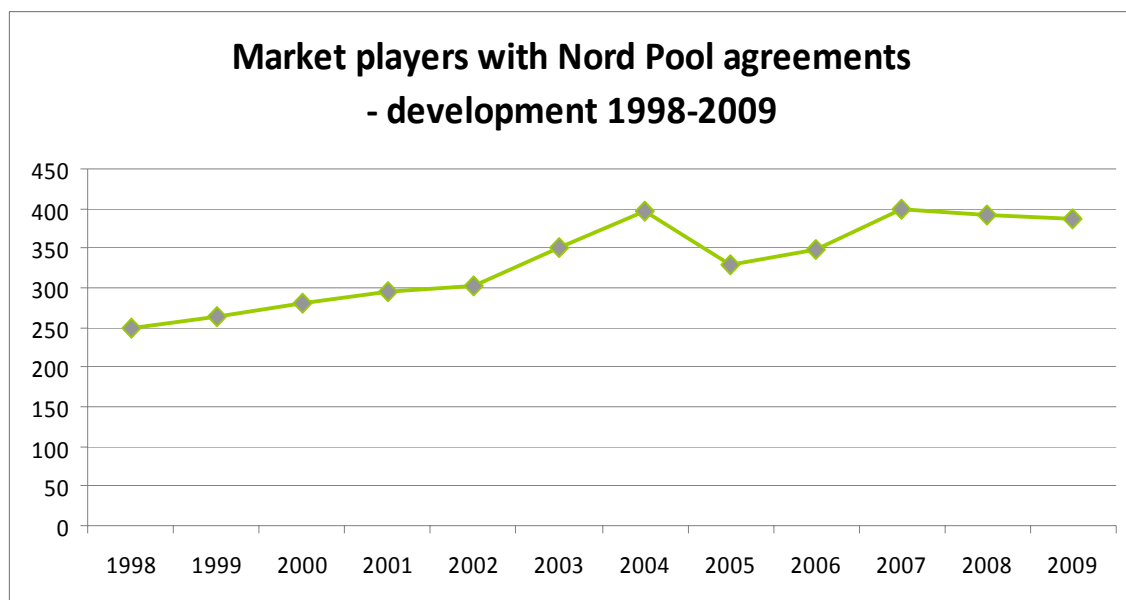


Figure 10: Number of market players with Nord Pool agreements

The figure shows that there was a steady increase in the number until 2004, from 250 in 1998 to 397 in 2004. The following year 2005 had a sharp reduction down to 330 market

players with Nord Pool agreements. The next two years had again a steady increase up to 400 in 2007. During the last two years there has been a slight reduction to 388 market players with Nord Pool agreements regarding the Nordic power market.

The following table shows the 21 different country locations of the current market players with exchange memberships or clearing client agreements regarding power contracts.

Table 1: Country locations of members and clearing clients during April 2010

Country locations of current members and clearing clients			
Country	Number of exchange memberships	Number of clearing client agreements	Total
Norway	49	107	156
Sweden	19	93	112
Finland	18	22	40
Denmark	8	12	20
United Kingdom	12	0	12
Switzerland	7	1	8
Cayman Islands	3	2	5
Germany	4	0	4
United States	4	0	4
Netherlands	4	0	4
Poland	3	0	3
Estonia	0	2	2
Ireland	0	2	2
Italy	1	1	2
Belgium	1	0	1
Bermuda	1	0	1
Luxemburg	1	0	1
Malta	0	1	1
Portugal	1	0	1
Spain	1	0	1
Virgin Islands	1	0	1

The table shows that 41 % of the market players had their legal base located in Norway. This is a reduction compared to 2000 when more than half of the market players were located in Norway. 45 % of the market players were located in the other Nordic countries while the remaining 14 % of the market players were located outside the Nordic countries. The following figure shows for different countries how their percentage of total turnover has developed 2004-2009.

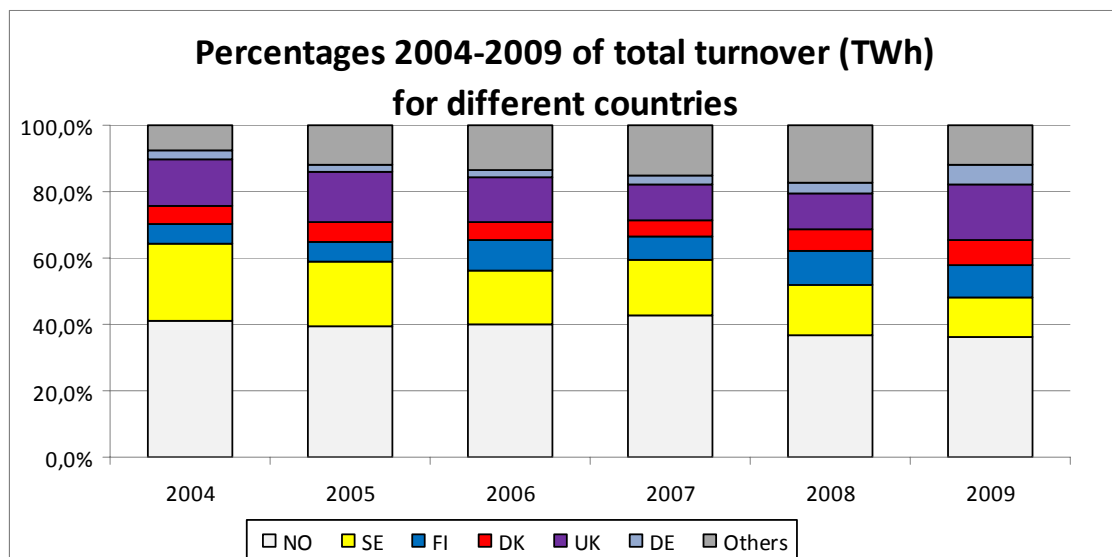


Figure 11: Percentages of total turnover (TWh) for different countries

The basis for the figure is the country location of the legal entity that has the agreement with Nord Pool. The country location can therefore be in another country than the production or consumption country. There are market players that have changed their country location during the years. The earlier trading by E.ON in Sweden has moved to E.ON Energy Trading in Germany. Norway includes besides Norwegian companies also foreign companies that have located their Nordic trading units to Norway. Figure 11 shall therefore be interpreted with caution. Nevertheless, the figure gives an indication of the importance for the Nordic market of different trading locations.

The figure shows that Norway is the most important trading location. The Norwegian share rose from 41 % in 2004 to 43 % in 2007. The share has thereafter fallen to 36 % in 2009.

The figure shows also that the Swedish share has fallen sharp from 23 % in 2004 to 12 % in 2009. The above described transfer of trading operations by E.ON explains a part of the fall. The German share has during the period risen from 3 % to 6 %.

It is very interesting to note the importance of international market players in the Nordic financial electricity market. The combined share of non-Nordic market players has risen from 24 % in 2004 to 35 % in 2009. The UK share was in 2009 for the first time the second biggest in the Nordic financial electricity market.

3.7 Market concentration

Company-specific information regarding exchange trade and cleared trade is not public. It is therefore not possible to describe the market shares for individual companies.

NordREG has instead asked for three different measures of the market concentration. The first measure is the minimum number of companies that are needed to reach 50 % of the market volume. The second measure is the minimum number of companies that are needed to reach 80 % of the market volume. The third measure is the combined share of Dong, E.ON, Fortum, Statkraft and Vattenfall (the 5 leading producers).

The following figure shows for each year 2004-2008 the minimum number of companies that are needed in order to reach 50 % or 80 % of the total volume (TWh).

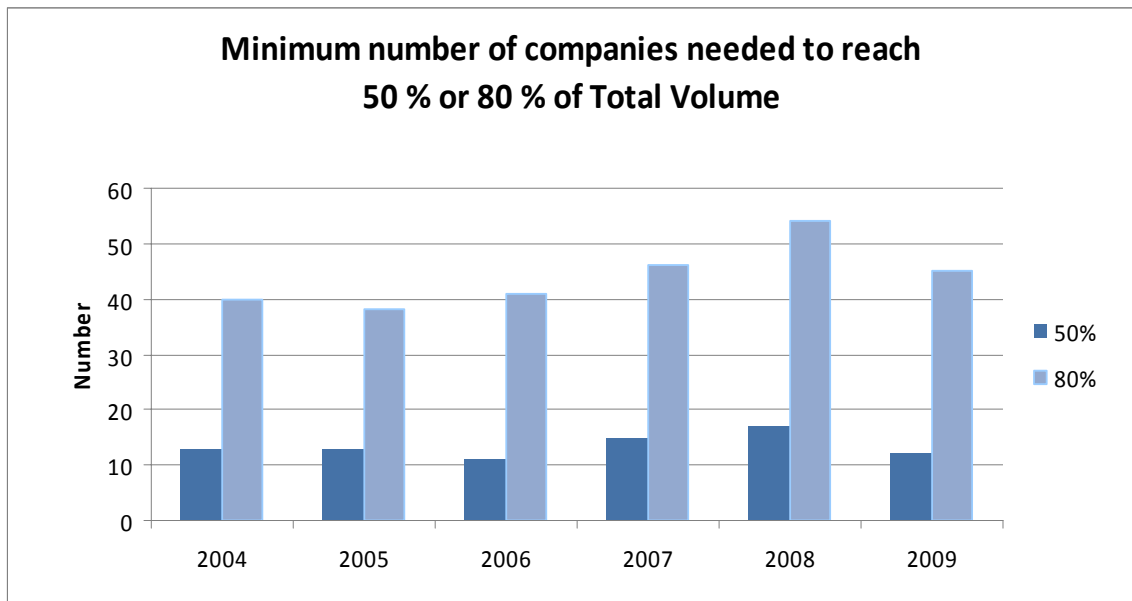


Figure 12: Minimum number of companies that are needed to reach 50 % or 80 % of total cleared volume

The figure shows that 11-17 companies have been needed 2004-2009 to reach 50 % of total cleared volume during one year. The lowest number was needed in 2006 and the highest number was needed in 2008. The figure shows also that 38-54 companies have been needed to reach 80 % of total cleared volume during one year. The lowest number was needed in 2005 and the highest number was needed in 2008.

The figure indicates very good competition in the Nordic financial electricity market. The combined market share of the 10 biggest traders has each year been less than 50 %. The combined market share of the 20 next biggest traders has in addition each year been less than 30 %.

The following figure shows how the combined share of total buy volume and total sell volume has developed 2004-2009 for the 5 leading producers.

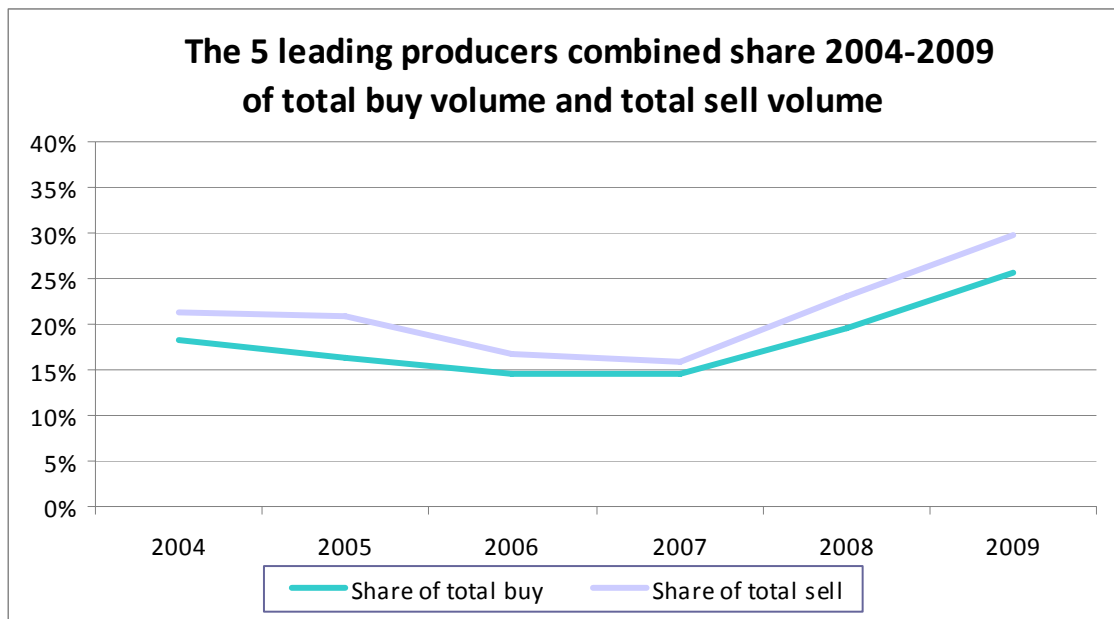


Figure 13: Combined shares of total buy volume and total sell volume for the 5 leading producers

The combined share of total sell volume was 21 % in 2004 for the 5 leading producers. The share decreased to 16 % in 2007 and has thereafter increased to 30 % in 2009. Their combined share of total buy volume was 18 % in 2004. The share decreased to 15 % in 2007 and has thereafter increased to 26 % in 2009.

These data indicate that the increase in cleared volumes 2004-2007 came from other market players than the 5 leading producers. However, the 5 leading producers have increased their volumes in 2008 and 2009. This means that the other market players had a sharper reduction in volumes 2009 because of the financial crisis than the general decline in total cleared volumes.

A bigger combined share in total sell than in total buy is natural for the 5 leading producers since producers have a fundamental need to hedge their production. However, the fact that their combined share in total buy is so near their combined share in total sell indicates that most of their turnover originates from trading instead of hedging.

The 5 leading producers combined share of the total turnover is both for sell and buy so low that it does not indicate any general problems of dominance in the financial market. This is consistent with the satisfaction in the interviews with the general functioning of the Nordic financial market. The market power of key players was seen as lower in the Nordic market than in other European markets.

However, several market players stated in the interviews that there is a liquidity problem in the supply of CfD-contracts. The following two figures show for different product categories the 5 leading producers combined share of total buy volume and total sell volume.

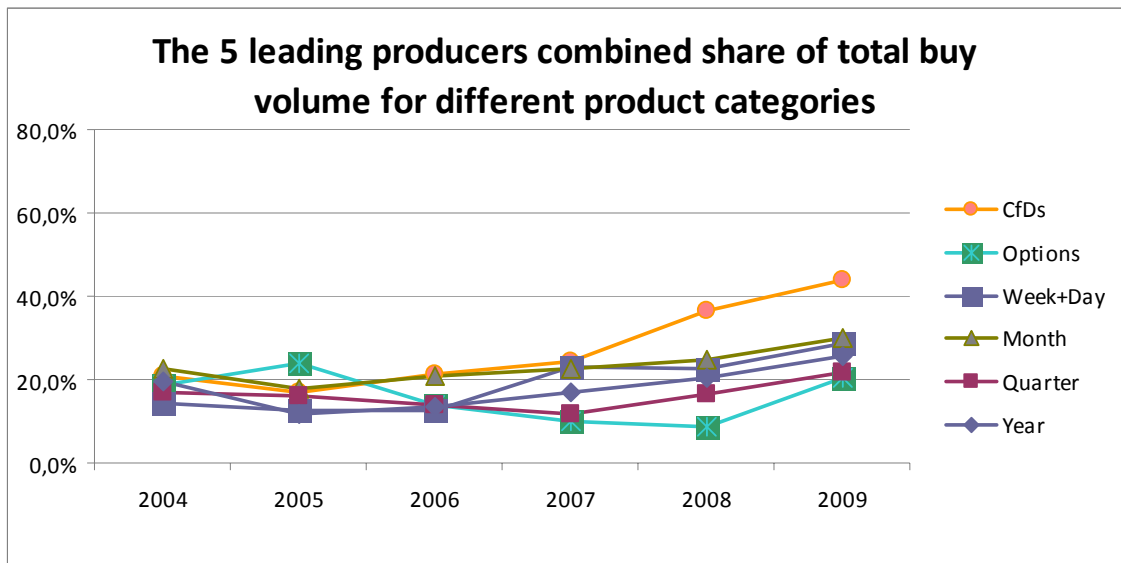


Figure 14: The five leading producers combined share of total by volume for different product categories

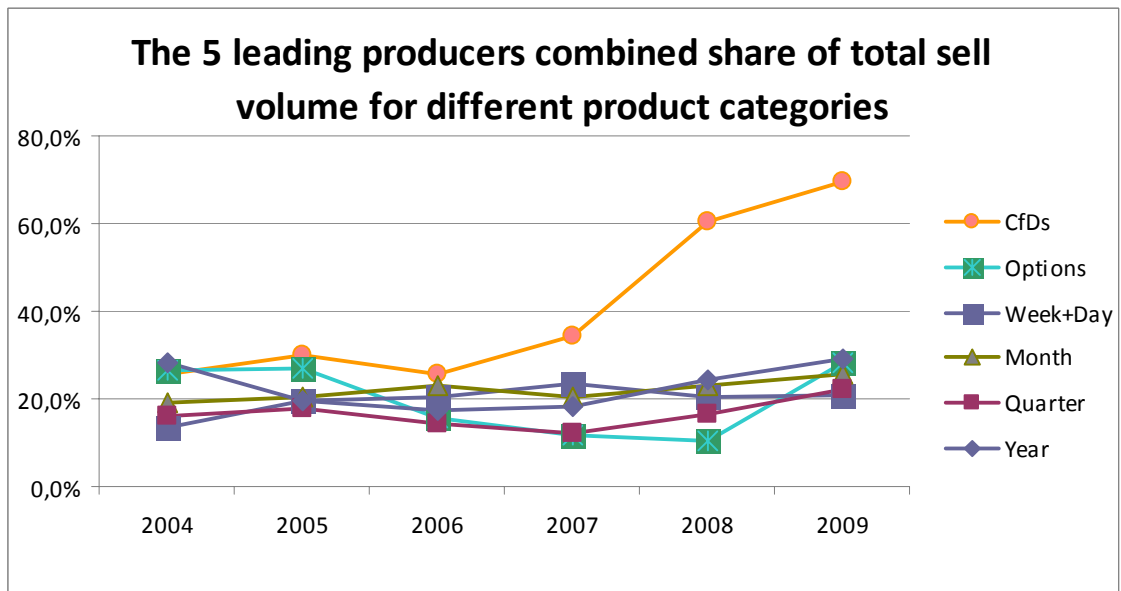


Figure 15: The five leading producers combined share of total sell volume for different product categories

The two figures show with one exception that the 5 leading producers combined shares of the trade in different product categories are nearly the same as their combined share of the total market. The exception is CfD-contracts where the 5 leading producers have a higher share of total buy volume and especially a higher share of total sell volume. The combined share of the 5 leading producers was much higher in 2008 and 2009 than earlier.

The fact that the 5 leading producers in 2008 and 2009 got such a high combined share of the supply of CfD-contracts is problematic if it reflects near monopolistic sell of CfD-contracts in the different areas. NordREG has therefore asked for a separation of the sell

from the dominant producer in an area from other sell by the 5 leading producers. The requested volume shows how much of total sell of CfD-contracts that originates from sell by Statkraft in Oslo-contracts, Vattenfall in Stockholm-contracts, Fortum in Helsinki-contracts and Dong in Copenhagen- and Århus-contracts.

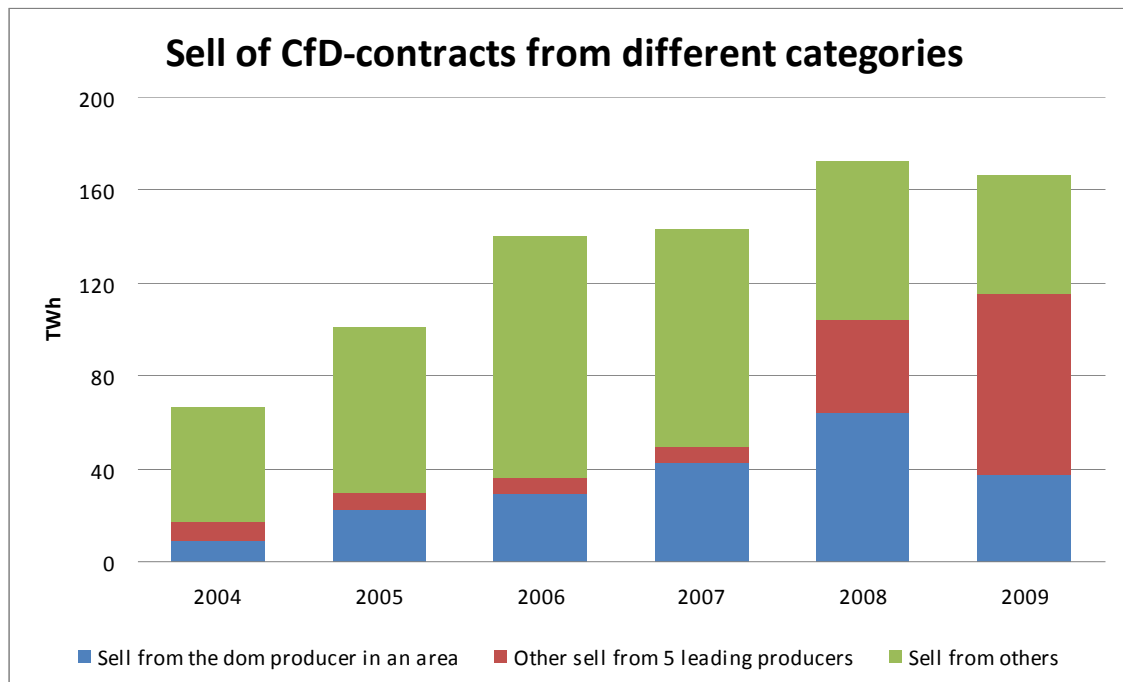


Figure 16: Sell of CfD-contracts from different categories of market players

The figure shows that sell from others than the 5 leading producers is bigger than the sell from the dominant producer in an area. The increase in 2008 and 2009 in sell of CfD-contracts from the 5 leading producers is in other countries than the country where they are the dominant producer. Such a supply in other countries broadens the competition in the CfD-market and reduces the risk of near monopolistic sell of CfD-contracts.

3.8 Nordic financial electricity products traded and cleared at other exchanges and clearing houses

The Markets in Financial Instruments Directive (MiFID) creates a competitive market in financial services and facilitate multiple trading facilities. This makes it a challenging task for the relevant authorities to monitor and supervise the financial markets.

The Imarex Group ASA consists of several subsidiaries among other Spectron Group Ltd and NOS Clearing ASA, both involved in trading of financial electricity products.

Spectron group is operating as an intermediary broker in a number of wholesale markets, including natural gas, electricity, oil, coal, metals, weather, petroleum products and emissions. Spectron operates one of the largest marketplaces for wholesale electricity in Europe – with billions of Euros worth of power traded through its hybrid electronic/phone broking system every month.

It covers the German, French, Nordic, Dutch, Belgian, Czech, Swiss and Danish markets. Tradable products include: physical electricity forwards, options, locational spreads, inter-period spreads and non-standard load shapes - from Day-ahead out to 10 years ahead. OTC clearing is available on most markets.

NOS Clearing provide clearing services for financially settled futures in the Nordic and German power markets. They also provide clearing services for Swedish electricity certificates.

Based on information from NOS Clearing we can however conclude that their clearing in the Nordic electricity products is very limited.

3.9 Earlier studies of the Nordic financial electricity market

3.9.1 Report by the Swedish Financial Supervisory Authority

The Swedish Financial Supervisory Authority (Finansinspektionen, FI) presented the report “The Financial Electricity Market” in May 2005.²

FI reviewed the financial electricity market in order to analyse it and to determine whether it meets the requirements that FI, as the regulatory authority, imposes on a well-functioning financial market. FI’s regulatory activities are geared toward creating the necessary conditions for a well-functioning market and ensuring that all players can participate on the same terms.

Electricity derivatives are legally defined as financial instruments. This implies that the laws and regulations that apply to other financial trading must also be applied to these markets. It also implies that companies that conduct trading in electricity-related financial instruments are subject to regulation by FI.

The report stated that the single most important factor of a functioning market is information. Due to the structure of the financial electricity market, in which the production companies are major players in the financial market as well, and energy facilities are also jointly owned by several companies, the identification and management of conflicts of interest is a key issue. It is important that conflicts of interest are identified and communicated to the market. The slightest suspicion of unequal access to information would affect confidence in the market, which would also affect the liquidity and efficiency of the market.

FI concluded that the financial electricity market leaves something to be desired in terms of its management of communications and manner of dealing with conflicts of interest. It is important to address these shortcomings in the interests of improving the functioning of the market and increasing participation in the market. FI found reason to believe that the lack of transparency is a disincentive for players that might actually be interested in participating in the market.

²Report 2005:6

The financial electricity market is a pan-Nordic market with the exchange Nord Pool in Norway. In this cross-border system, FI can only regulate the parts that relate to the Swedish financial market. Accordingly, a well-functioning market requires the continued cooperation of industry organizations and public agencies in and outside Sweden, to build knowledge of the market and the factors that influence the market, and to ensure that it is possible to act effectively. However, FI found from a regulatory viewpoint that the financial electricity market was not sufficiently significant to justify a higher ranking among FI's priority areas and an intensification of FI's involvement in this area at the expense of its other responsibilities.

3.9.2 Study by the Swedish Energy Agency

The Swedish Government instructed in October 2005 the Swedish Energy Agency to analyse the financial electricity market. The task was to enter more deeply in the analysis presented by the Swedish Financial Supervisory Authority and to give it a concrete form. The need for actions should be assessed and possible measures should be proposed. The analysis should be done in consultation with the Swedish Financial Supervisory Authority and Svenska Kraftnät. The task should be reported after consultation with the Swedish Competition Authority.

The report "The Financial Electricity Market" was presented in March 2006. One basis for the report was interviews and questionnaires. Earlier studies were analysed and new consultancy studies regarding efficiency and rules and regulations were performed. Comparisons were done with other commodity markets and with the securities market.

The report concluded that the Nordic financial electricity market is well-functioning in relation to other financial electricity markets and also in relation to other commodity markets. The report identified some insufficiencies regarding transparency, management of market-sensible information, supervision, rules and regulations. Measures were proposed in order to mitigate these insufficiencies and to enhance the efficiency of the market.

The report stated that the supervision and interpretation of rules and regulations for the Nordic market is complicated since several jurisdictions are involved.³ There are differences in the starting points for different supervision authorities when they assess the efficiency and the function of the financial electricity market. One proposal from the Energy Agency was that the Nordic Governments should initiate a harmonisation of rules and regulations in the Nordic countries.⁴ An increased co-operation and co-ordination between the different authorities was seen as desirable.

3.9.3 Study by Matti Purasjoki for the Finnish Ministry of Trade and Industry

Matti Purasjoki, previous Director General of the Finnish Competition Authority, was appointed by the Finnish Ministry of Trade and Industry to present a report on the performance of electricity wholesale and retail markets. The report "Performance of electricity wholesale and retail markets" was presented in September 2006 to the

³ Swedish Energy Agency, page 76

⁴ Swedish Energy Agency, page 120

ministry. The report dealt with the retail market, the spot market and the derivatives market.

The report found that the derivatives market for electricity functions as a part of the general financial market and that its performance can be considered normal.⁵ The report stressed that Nord Pool ASA is a Norwegian-Swedish company owned by the Norwegian and Swedish TSOs and that it is controlled through Norwegian legislation.⁶

The main proposals in the report concerned securing a sufficient supply of electricity and controlling market power. Other proposals related to the supervision of the electricity market and to the structure of the TSOs and the Nordic power exchange.

The report concluded that the performance of the Nordic electricity market would probably benefit to a major extent if a political agreement could be reached on the Nordic level on diversifying the ownership, governance and supervision of the power exchange.⁷ The report concluded also that the power exchange must operate openly. First of all, it must be ensured that the energy market authorities have access to real-time information.⁸

3.9.4 Study by ECON Pöyry for Oberoende Elhandlare

The Swedish organisation Oberoende Elhandlare (Independent Electricity Suppliers) presented February 2009 the report "Price areas and competition". The report was done by Econ Pöyry and the aim with the report was to illustrate consequences for the competition and for final customers if a price area division within Sweden is decided.

The report stated that more price areas will increase the risks and costs for the electricity suppliers. The increased difficulties to perform price area hedging will probably decrease the number of electricity suppliers that are active in all Sweden. In such a case the competition in the retail market will be reduced.

The function of the CfD-market was according to the report not satisfactory. It was stated that the liquidity is poor and that the share of exchange traded CfD-contracts in relation to the total trade in CfD-contracts has to be much higher in order to increase the transparency and the credibility. It was also stated that the liquidity in CfD-contracts risks to be further reduced if more price areas are introduced. One reason was that there will be fewer market players with a physical need for hedging in each price area than in the whole country.

3.9.5 Econometric analysis of the efficiency of the Nordic financial market

An econometric analysis of the efficiency of the Nordic financial market was presented 2009 by Hongming Yang, Sidong Liu, Yongxi Zhang and Xiao Luo in the article "Empirical Research on Efficiency of the Electricity Futures Market".⁹ The efficiency was investigated from three aspects: market validity, price discovery and hedging efficiency. Two stages of the development of the market were analysed. The first stage was 1996-1999 and the second stage was 2000-2003.

⁵ Purasjoki, page 15

⁶ Purasjoki, page 31

⁷ Purasjoki, page 37

⁸ Ibid

⁹ International Journal of Emerging Electric Power Systems, vol. 10, iss. 2, art. 6

Market validity reflects the speed and extent with which the market absorbs information. The efficient market hypothesis defines weak-form efficiency as a market where all historic information is incorporated in the price. This means for a futures market that the futures price will evolve according to a random walk process. Changes in the futures price between one day and the next can not be predicted. Yang et al. found that the Nordic electricity futures market satisfies the weak-form efficiency hypothesis at the 99 % significant level. In addition they found stronger evidence for weak-form efficiency in the second stage 2000-2003 than in the first stage 1996-1999.

Price discovery is an essential function to be performed by a financial market. Yang et al. found that the futures market plays a dominant role in the price discovery in the Nordic electricity market. A change in the futures price has in the long term a greater impact on the spot price than the impact on the futures price by a change in the spot price. However, the futures price has in the Nordic electricity market a lower short term forecasting ability regarding the future spot price than the forecasting ability in commodity markets such as oil and soybeans. The short term forecasting ability was higher in the second stage 2000-2003 than in the first stage 1996-1999.

The basic concept of hedging is to eliminate or reduce risks in the spot market by using futures contracts in the portfolio. A measure of the hedging performance is the risk reduction from performing hedging versus not performing hedging. Yang et al. found that hedging can reduce the market risk to a certain extent but that there exists a high basis risk in the Nordic electricity futures market. The hedging efficiency was better in the second stage 2000-2003 than in the first stage 1996-1999.

4 Financial electricity trade in other European markets

4.1 Studies by the Commission or for the Commission

In 2005 the commission decided to set out a more pro-active application of the competition policy and launched sector inquiry in gas and electricity markets. Such inquiries are investigations that the European Commission carries out into different sectors. The energy inquiry responded to concerns voiced by consumers and new entrants in the sector about the development of wholesale gas and electricity markets and limited choice for consumers. In 2007 the European Commission published its final report “DG competition report on energy sector inquiry”

The report presented the following table regarding traded volumes in futures/forward contracts as a percentage of national electricity consumption.¹⁰

Table 2: Traded volumes in futures/forward contracts as a percentage of national electricity consumption (June 2004 - May 2005)

	Power exchanges	OTC brokered	Power exchange + OTC
OMEL – Spain	No exchange trading	negligible	n.a.
GEM – Italy	No exchange trading	n.a.	n.a.
Nord Pool - Nordic region (2005)	196%	327%	523%
EEX – Germany	74%	566%	639%
Endex – The Netherlands (since Dec. 2004)	39%	509%	548%
Belgium	No exchange trading	22%	22%
Powernext – France	6%	79%	85%
EXAA – Austria	No exchange trading	n.a.	n.a.
Pol PX – Poland	No exchange trading	n.a.	n.a.
UKPX – UK	0%	146%	146%

Source: DG Competition

The table identifies three areas with forward trading as a high percentage of electricity consumption: Germany (639 %), The Netherlands (548 %) and the Nordic region (523

¹⁰ DG Competition, Table 17 p. 127

%). The percentage for UK was 2004/2005 only 146 % according to the table. The OTC volume in the table was volumes reported to the Commission by major energy brokers. However, the Nordic volume included only OTC contracts cleared by Nord Pool and underestimated thus the total volume since it did include uncleared OTC contracts.

The sector inquiry investigated the degree of market concentration in forward markets and presented graphs for Belgium, France, Germany, Nordic region, The Netherlands and UK regarding market shares in 2004.¹¹

The graphs showed that the three biggest sellers of yearly forward products had in 2004 a combined share of 75 % in Belgium, 53 % in The Netherlands, 37 % in France, 31 % in the Nordic region, and 29 % in Germany and UK. The three biggest buyers of yearly forward products had a combined share of 88 % in Belgium, 48 % in the Netherlands, 36 % in France, 31 % in UK, 27 % in the Nordic region and 23 % in Germany.

The following was said in the conclusion regarding concentration and market power:¹²

“Customers have little trust in the functioning of wholesale markets. They suspect market manipulation on the spot and forward markets by large generators to be the main reason for recent price increases. Concentration is a key factor in the proper analysis of the price developments. Other factors are the developments in fuel prices and the impact of the EU Emission Trading System.

Most wholesale markets have remained national in scope. The level of concentration in generation has remained high in most Member States giving generators scope for market power. The level of concentration in trading markets is less striking than in generation, particularly on forward markets where electricity can be traded several times before delivery. However, all spot and forward markets, even the most developed forward markets, remain dependent on the few players which enjoy a net excess of generation compared to their retail supplies.”

Moffatt Associates (MA) presented in 2008 the report *Evaluation of Factors Impacting on Current and Future Market Liquidity and Efficiency*. The study was commissioned by DG TREN. The methodology used by MA was to conduct interviews with stakeholders, to set up and lead focus group discussions covering regional electricity and gas markets and to perform an online market survey. MA concluded:¹³

“Compared with other commodity and financial markets, EU wholesale energy markets are relatively underdeveloped. Electricity is significantly more advanced than gas, but progress is not uniform and there are large variations in market liquidity and efficiency across the EU. In addition, in the case of both electricity and gas, wholesale market trading is for all practical purposes a non-regulated activity with a large and growing proportion of energy market trading taking place in the opaque OTC market.”

MA found that there has been a significant increase in trading via exchanges and a dramatic growth in OTC trade.¹⁴

¹¹ SEC(2006) 1724 Annex D

¹² SEC(2006) 1724 p. 150

¹³ Moffatt Associates (p.80).

¹⁴ Ibid.

An overall ranking of regional market liquidity and efficiency was presented by MA.¹⁵ The Northern region was ranked first, UK/Ireland second and the Central West region third.

The focus group for the Northern region considered price discovery adequate with a 50/50 split of trading between OTC and exchanges. Liquidity and transparency across the region was considered good by all participants. There was a consensus that currently there were no instances of market abuse.¹⁶

The UK/Ireland focus group considered transparency to be amongst the best in Europe. There was some concern about the lack of a reliable price index on which futures contracts could be based. Traders felt that there would be more participants within the market if there were not the requirement to take physical delivery of power¹⁷.

The focus group for the Central West region considered price discovery to be good, with prices available on existing platforms and most products sold through brokers. There were some concerns over the possibility of standardised products which do not differentiate between users needs. Currently, bilateral deals solve this problem and so it was deemed necessary that both types of contract are needed to truly have liquidity. Transparency was discussed in more detail; it was felt that transparency within the region is good but could be better in terms of generation information. Participants did feel that there was potential for market manipulation and there was support for an EU wide/regional approach to be taken towards the subject of market abuse¹⁸.

ECORYS presented in 2008 the report *Historical and current data analysis of EU wholesale electricity, gas and CO₂ markets*. The study was commissioned by DG TREN. The goal of the study was to present an overall picture of these markets by focusing on historical and current data analysis. ECORYS retrieved data from the various European energy exchanges and from energy brokers.

The presented data regarding power exchanges contained some basic misunderstandings. According to ECORYS, Nord Pool does not currently provide derivatives products in the power market, which is obviously incorrect¹⁹. Also, the presented spot volumes for the Spanish market operator OMEL are only one per mille of the real volumes.²⁰ The exchange traded volumes in futures contracts were in 2007, according to ECORYS, 942 TWh on EEX (Germany), 97 TWh on Endex (The Netherlands, UK and Belgium), 39 TWh on Powernext (France) and 1.5 TWh on OMIP/MIBEL (Spain and Portugal).²¹

ECORYS cited FSA²² regarding the total size of the European OTC market (see the following section). It also presented estimation by Fortis Gas, Power and Coal Trading that the OTC volume regarding German power contracts is approximately 2500 TWh²³.

¹⁵ Moffatt Associates (p.45).

¹⁶ Moffatt Associates (p.49).

¹⁷ Moffatt Associates (p.46).

¹⁸ Moffatt Associates (p.54-55).

¹⁹ ECORYS p.27

²⁰ ECORYS p. 25,29,30

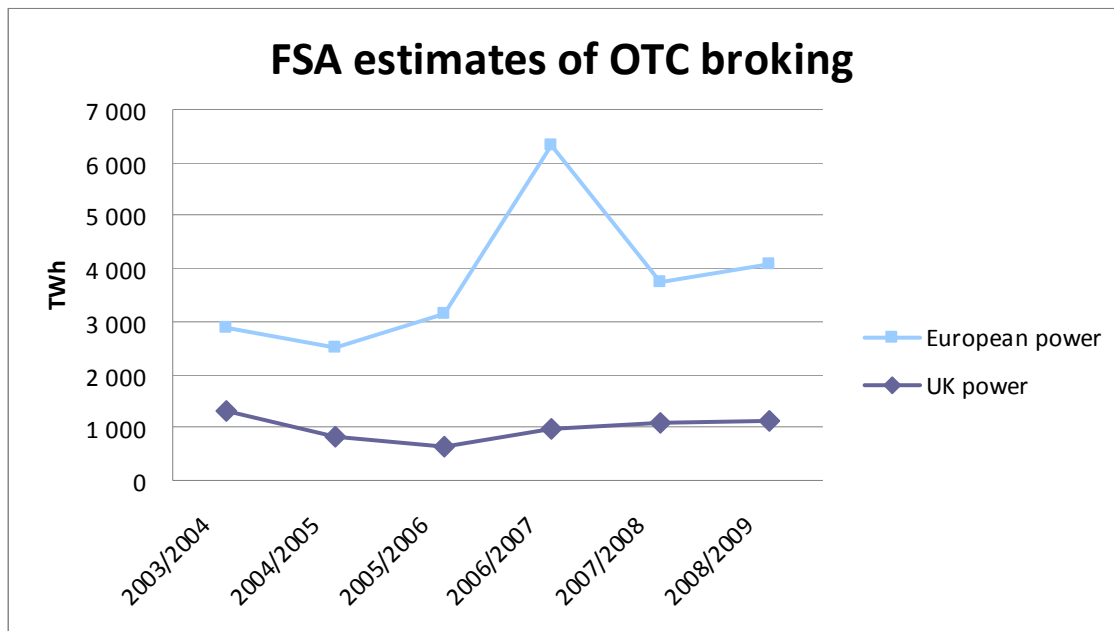
²¹ ECORYS (p.30).

²² The Financial Services Authority in United Kingdom

²³ Moffatt Associates (p.40).

4.2 FSA and Ofgem reports

FSA in United Kingdom has during the last years written to energy market brokers to ask for information about trading volumes and values in the gas, power, coal and emissions markets. The findings are published yearly in the documents Analysis of activity in the energy markets. The following figure shows the estimated size 2003-2009 of the markets for UK power and European power. The figure for each year means the trading from 1 August the preceding year to 31 July. The data refer to business done through broking companies under FSA supervision and do not include power exchanges or broking companies outside FSA supervision. However, companies under FSA supervision are the major brokers in most European energy markets.



Source: Annual FSA documents Analysis of activity in the energy markets

Figure 17: FSA estimates of the size of the markets for UK power and European power.

The figure shows that the trade in UK power has decreased from 1 311 TWh in 2004 to 1 130 TWh in 2009. The lowest estimated size of the market for UK power was 810 TWh in 2005. Trade in European power has increased from 2 879 TWh in 2004 to 4 090 TWh in 2009. The highest estimated size of the market for European power was 6 337 TWh in 2007. The main European markets are the German and the Nordic markets but UK companies are active brokers in also the Dutch and several other European markets.

The FSA reports present also data whether the deals were conducted via electronic broking or via the phone. In 2004-2008 were volumes conducted on screen higher than voice brokered volumes. However, in 2009 it was a near 50/50 split between voice broking and electronic broking for both UK power (49 % voice brokered) and European power (55 % voice brokered). FSA sees this as a likely consequence of the financial crisis and ensuing volatility. Voice broking facilitates for the participants to build a greater picture of the overall market conditions.

The Office of Gas and Electricity Markets (Ofgem) published in June 2009 the report *Liquidity in the GB wholesale energy markets (62/09)*. The report showed that traded volumes in the electricity market fell very sharp from 2002 to 2005.²⁴ Rapid growth of vertical integration, the collapse of Enron and the exit of a number of active wholesale market participants were among the contributing factors. Total traded volumes have thereafter increased to about 1 000 TWh during the last years. However, the traded volumes in 2002 were twice the present volumes and the churn in wholesale electricity has fallen from around 7 times the underlying physical market in 2002 to around 3 times.

The report found that the liquidity in the GB wholesale electricity market is low compared to that in many other European electricity markets, the GB gas market and other commodity markets.²⁵ The report outlined possible policy options that could improve liquidity.

After the June 2009 report, Ofgem hosted a seminar and held discussions with market participants to understand further their concerns relating to low electricity market liquidity. One of the main concerns raised by small/independent suppliers was that they have limited access to efficient risk management tools in the form of appropriate forward physical or financial products. In addition, they noted significant challenges in relation to credit requirements. Respondents also cited short term imbalance risk as an important barrier.

Ofgem presented in February 2010 the consultation document *Liquidity Proposals for the GB wholesale electricity market (22/10)*. The document states in the overview that the low level of liquidity makes it difficult to enter the market and operate as a non-vertically integrated market participant. A key concern is the impact that this has on energy supply markets. Ensuring that small/independent suppliers are able to enter the market and grow their customer base is important to provide competitive pressure, particularly on the Big 6 suppliers who account for over 99% of the domestic retail customer market. A liquid wholesale market is also important for investment in generation.

The consultation document mentions the launch of a new electricity exchange by N2EX, APX's auctioning of Britned capacity once it comes on stream, and potentially wider European market coupling as market initiatives which could help to improve GB wholesale market liquidity. The preferred outcome is that the market develops solutions to address the liquidity issue and the availability of products that market participants need. Ofgem has therefore set out success criteria to judge whether the market has addressed the identified concerns. Specifically, Ofgem wants to see the market delivering²⁶:

- High volumes traded in standard products;
- The availability of key longer dated products and/or financial derivatives;
- Use of trading platforms by small/independent suppliers; and
- Positive feedback from small/independent suppliers and potential entrants.

²⁴ Ofgem (2009), (p. 32)

²⁵ Ofgem (2009), (p. 4)

²⁶ Ofgem (2010), (p 2-3)

Ofgem states that it is determined to act and to introduce suitable policy remedies if the market does not deliver against these proposed criteria within a reasonable timeframe. The document lists the following policy proposals which could be introduced in these circumstances, either individually or in combinations:

- An obligation requiring large generators to trade with small/independent suppliers.
- Market making arrangements
- Mandatory auctions
- Self-supply restrictions

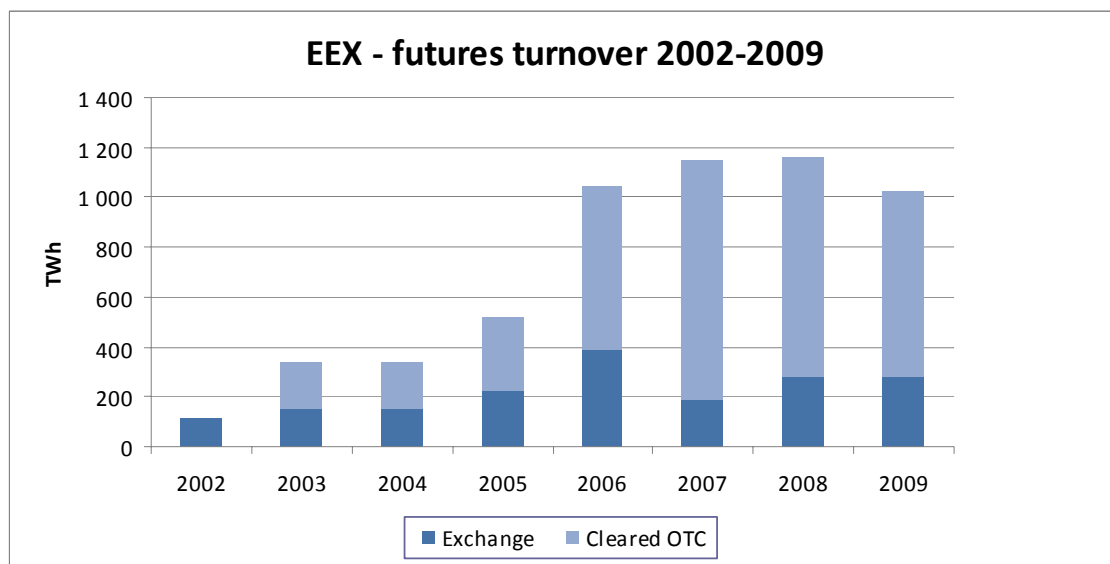
4.3 Exchange trade and cleared OTC trade on EEX

The German electricity market is the largest in Europe. The electricity demand was around 540 TWh in 2008.

European Energy Exchange AG (EEX) was created in 2002 as a merger between the two German exchanges LPX Leipzig Power Exchange and EEX, who both started in 2000. The merged EEX started financial trade in 2002 and OTC clearing in 2003.

EEX and the French power exchange Powernext integrated in 2009 their spot and financial markets into two joint subsidiaries, EPEX Spot SE and EEX Power Derivatives GmbH. EEX own 80 % of EEX Power Derivatives and Powernext own the remaining 20 %. The company organizes trade in German and French power futures and is located in Leipzig and has also a branch in Paris.

The following figure shows the yearly turnover 2002-2009 in exchange traded financial contracts and cleared OTC contracts on EEX. The turnover 2009 is for the new company EEX Power Derivatives.



Source: Annual press releases from EEX

Figure 18: Turnover in financial contracts on EEX.

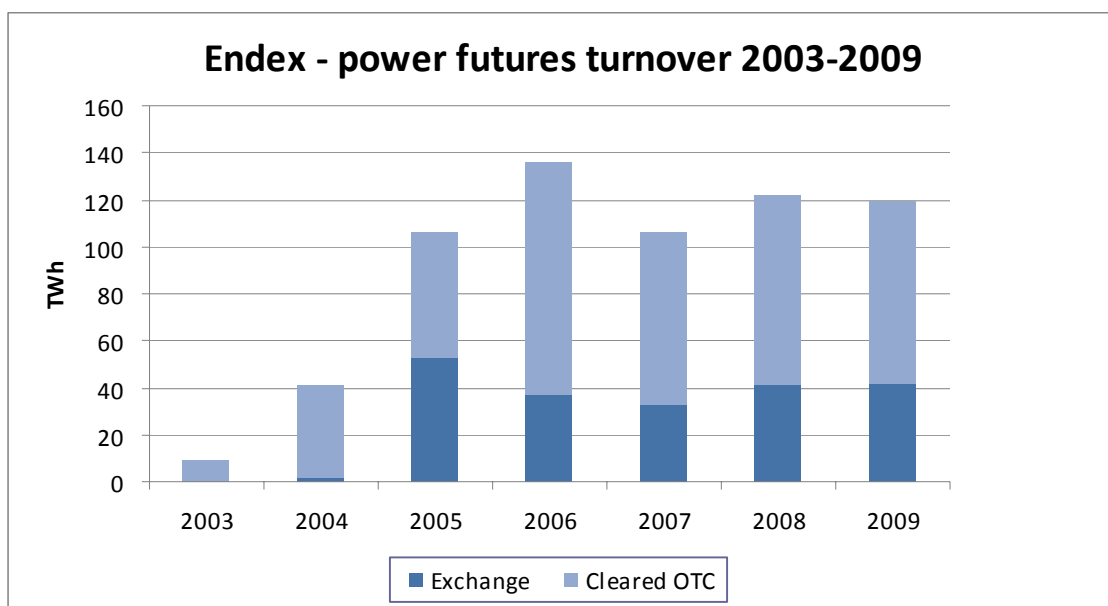
The figure shows a rapid increase until 2006. The highest turnover was 1 165 TWh in 2008. The 2009 turnover decreased to 1 025 TWh. The 2009 volume included 31 TWh in French power futures.

The highest turnover in exchange traded futures was 389 TWh in 2006. The exchange turnover in 2009 was 285 TWh. The percentage of exchange trade in relation to total cleared trade was 28 % in 2009.

Most of the OTC power contracts regarding Germany are uncleared. The ECORUS report mentioned above estimated that the OTC volume regarding German power contracts is approximately 2500 TWh.

4.4 Exchange trade and cleared OTC trade on ENDEX

The Amsterdam based European Energy Derivatives Exchange (ENDEX) started in 2003 to clear Dutch power futures. It started in 2004 exchange trade in Dutch power. Trade in Belgian contracts started in 2005. The following figure shows the yearly turnover 2003-2009 in exchange traded financial contracts and cleared OTC contracts on ENDEX. APX Group, which comprises the APX spot markets for Dutch power and UK Power, acquired ENDEX in 2008.



Source: Annual press releases from ENDEX and APX Group

Figure 19: Turnover in power futures on ENDEX.

The figure shows a rapid increase until 2006. The highest turnover was 136 TWh in 2006. The 2009 turnover decreased to 120 TWh. The 2009 volume included 9 TWh in Belgian power futures.

The highest turnover in exchange traded futures were in 2005. The exchange turnover in 2009 was 42 TWh. The percentage of exchange trade in relation to total cleared trade was 35 % in 2009.

5 Legal framework and regulation

The Nordic financial electricity market has to obey the specific rules related to the underlying commodity, electricity, as well as the specific rules related to financial markets. In both areas there is European legislation as well as national and a framework for regulation of the markets. The combination of these two areas of legislation is particular to financial electricity markets.

Regulation of the electricity market

A well functioning physical market is essential for a well functioning financial market, just as a well functioning financial market gives tools for hedging with the potential of increasing the scope of electricity trade.

Regulation 1228/03 on grid access sets out several legally binding European transparency requirements. ERGEG's regulatory guidelines on transparency goes a little further than the regulation and have been used as a starting point in negotiations with market participants in the Northern electricity regional initiative in implementation of the regions transparency requirements from 2007.

The European Commission has invited ERGEG to take forward further work on transparency by preparing 2 comitology guidelines proposals on transparency. One of the transparency guidelines deals with trading transparency and tailor made regimes of reporting. A monitoring platform or institution is foreseen to monitor trading transparency. The 2.nd comitology guideline on transparency deals with fundamental electricity transparency data requirements. This work stream takes the work of the regional transparency requirements in the Northern regional electricity initiative as the benchmark in order to make rules valid in a European context. The work is carried out in close cooperation with ENTSO-E and by consulting stakeholders.

The guiding document for fundamental transparency is the Report on Transparency from 2007 for the region Northern Europe.

The Nordic TSOs and Nord Pool Spot have taken on to publish the required data on the website of Nord Pool Spot. In addition to this, some of the provisions of the Nord Pool Rulebook require publication of so called Urgent Market Messages (UMM) as soon as important changes in the availability of transmission links or production units are known. This transparency is important to keep the confidence in the market. Transparency issues have not been the focus of this study.

5.1 Regulation of the financial market

The European regulatory framework for financial markets has been implemented slightly differently in the European as well as in the Nordic countries. The directives which have the greatest impact on the Nordic financial market for electricity are Markets in Financial Instruments Directive and Market Abuse Directive.

Markets in Financial Instruments Directive

In April 2004 the European Parliament and Council approved the directive on markets in financial instruments (MiFID).²⁷ From 1st of November 2007 MiFID replaced the Investment Services Directive (ISD). MiFID harmonizes regulation for investment services in the Member States and its purpose is to enhance the protection for investor and increase competition in the trade in financial instruments in the securities markets. The directive is also applied in Norway, Island and Liechtenstein.

The directive is binding in terms of the objectives that should be achieved. However, the countries decide themselves how the directive should be implemented. If a dispute about the implementation occurs then the European Court of Justice determines the dispute.

The directive concerns, among other things, issues regarding the distinction between different marketplaces, transparency, customer categorization, investor protection and Investment Services.

Electricity as a physical product is not regulated by MiFID as the directive only applies to investment companies and regulated markets for financial instruments. However, energy derivatives traded on a regulated market are included in MiFID as the directive also covers options, futures, swaps, and any other derivative agreement concerning commodities for physical settlement - if traded on a regulated market or a multilateral trading facility.²⁸

Companies which provide investment services exclusively within the same group are exempt from the permit requirement under Article 2.1a and b. MiFID also makes exception for those who provide investment services in the course of professional activities regulated by law or regulation or ethnic rules on the activities in question.²⁹

This means that a large part of the fundamental players who are active in the financial electricity markets are exempt from the requirement of license. The extent of supervision of these actors will therefore depend on how the different countries have implemented the directive.

According to MiFID each Member State shall designate the competent authorities which are to carry out each of the duties provided for under the different provisions of the Directive (article 48 (1)). But if a Member State designates more than one competent authority to enforce a provision of the Directive, their respective roles shall be clearly defined and they shall cooperate closely.³⁰

The competent authorities shall be public authorities, without prejudice to the possibility of delegating tasks to other entities on certain areas.³¹

A central part of the directive is the principle of home country authorization. This means that a Securities Companies that has received a licence to carry out Securities Trading in

²⁷ Directive 2007/44/EC

²⁸ Directive 2007/44/EC cf. annex 1 of the directive

²⁹ Directive 2007/44/EC, Article 2.1 c

³⁰ Directive 2007/44/EC, Article 49

³¹ Ibid. Article 48, 2

its home country also has the right to operate on regulated markets in all the other Member States.

Under MiFID each Member State shall require that any person providing investment services or activities in the form of regular activity or business on a professional basis must obtain permission from the competent authority.³²

5.1.1 Denmark

MiFID is transposed to Danish law through the Danish Securities Trading Act³³.

In Denmark, it is the Danish FSA which has exclusive competence to supervise the securities markets in Denmark (including regulated markets), and the competences of the Danish FSA in relation to regulated markets are laid down in section 83 of the Danish Securities Trading Act. Activities covered by this Act may not be commenced until the Danish FSA has granted a license for the activity in question which includes issuing licences for operating a regulated market (section 8).

As can be seen, MiFID does not rule out the possibility of shared powers in relation to the supervision/control of regulated markets, and DERA could therefore have powers in the field of financial derivatives (based on electricity as a commodity) if it should be deemed appropriate to make the necessary legislative changes.

Today, the Danish Securities Trading Act only states (section 83a) that the Danish FSA may decide that the powers of the Danish FSA under certain (enumerated) sections of the Securities Act may be exercised on behalf of the Danish FSA by an operator of a regulated market, or the company operating an alternative market place on the basis of more detailed conditions.

Therefore, the present Danish Securities Trading Act does not allow for delegation to other public authorities even if this is possible under MiFID. The Danish FSA today has exclusive powers in the field of financial regulation.

5.1.2 Finland

In Finland MiFID has been implemented partially by the Securities Markets Act (495/1989) Chapter 10 (923/2007, applying to derivative contracts), and partially by the Act on Trade in Standardized Options and Futures (772/1988).

5.1.3 Sweden

In Sweden, the MiFID is implemented in the Securities Act and the law on trade in financial instruments. In Sweden it is the Swedish Financial Supervisory Authority which has the jurisdiction to supervise the securities markets. They also grant permission for the activity in question and licenses to operate in a regulated market.

5.1.4 Norway

In Norway, the MiFID is implemented through the Securities Trading Act and the Stock Exchange Act. The Financial supervisory authority of Norway has the jurisdiction to

³² Ibid. Article 5.1

³³ Consolidated Act no. 795 of 20 August 2009.

supervise the securities markets. They also grants permission for the activity in question and licenses to operate in the regulated market.

5.2 Market Abuse Directive

From 12 October 2004 the Market Abuse Directive (MAD) replaced the insider directive from 1998 which was no longer considered sufficient regulation. To quickly achieve a common financial market EU used the Lamfalussy process to create a regulation. The process is faster and more flexible than usual and is based on collaboration between various institutions and committees in the EU market practitioners, in which both industry and consumer interests are represented. The process consists of four levels.

The Directive provides a common EU framework for the disclosure of information to the market and aims at the prevention, detection, investigation and sanctioning of insider trading and market manipulation. The purpose of the directive is to ensure the integrity of financial markets in Europe and enhance investor confidence in these markets. Market abuse includes insider trading, unauthorized disclosure of inside information and market manipulation. Market manipulation is defined as one player in particular through transactions or orders to trade information dissemination of false or misleading signals to the securities market on supply, demand or price of financial instruments.

MAD applies almost exclusively to financial instruments admitted to trading on a regulated market. Physical products (e.g. spot market products) are not covered and derivatives markets products are covered only if they are admitted to trading on a regulated market.

The scope of disclosure obligations in MAD does not apply to physical market products, nor are derivatives markets covered because the disclosure obligations in MAD relate to issuers. In the context of derivatives markets, the issuer of a derivative is usually the market operator, which is not an issuer within the meaning of MAD. The scope of market abuse regulations (insider trading, market manipulation) does not apply to physical markets for electricity and gas. Thus, activities in these markets are not covered as long as the derivatives market is not affected. In addition, the commodity derivative specific definition of insider information in MAD is difficult for securities regulators to apply, in the absence of a clear definition of the information that users of commodity markets can expect to receive in accordance with accepted market practices on those markets.

According to MAD (Article 11) each Member State shall designate one single administrative authority competent without prejudice to the competences of the judicial authorities to ensure that the provisions adopted pursuant to the Directive are applied.

The competent authority shall be given all supervisory and investigatory powers that are necessary for the exercise of its functions. The competent authority can though exercise its power in collaboration with other authorities or market undertakings, or it can delegate authority to such market undertakings or authorities if it is done under the responsibility of the competent authority (Article 12).

5.2.1 Denmark

MAD is implemented in Danish legislation through the Danish Securities Trading Act

According to MAD (Article 11) each Member State shall designate one single administrative authority competent without prejudice to the competences of the judicial authorities to ensure that the provisions adopted pursuant to the Directive are applied. In Denmark the Danish FSA has been appointed as the competent body.

DERA can therefore not be given the overall responsibility for supervising insider trading and market manipulation in relation to energy derivatives. However, it would be possible for DERA to supervise and control the areas jointly with the Danish FSA – or DERA could supervise/control the financial markets in electricity under the overall responsibility of the Danish FSA.

In terms of delegation of authority, the Danish FSA may decide that the powers of the Danish FSA under certain (enumerated) sections of the Danish Securities Trading Act may be exercised on behalf of the Danish FSA by an operator of a regulated market, or the company operating an alternative market place on the basis of more detailed conditions (section 83 a).

The Danish Securities Trading Act does not allow delegation of powers to other public authorities although this is possible under MAD. The Danish FSA is therefore the sole competent financial authority in Denmark, and DERA can only get regulatory powers in the field of energy derivatives if the Danish Securities Trading Act is amended to allow for such delegation to other public authorities.

5.2.2 Finland

MAD has been implemented mainly by the Securities Markets Act (495/1989) Chapter 5 (297/2005, provisions on market abuse) and partially by the Act on Financial Supervisory Authority (878/2008, administrative procedures) and criminal code (39/1889, Chapter 51 penal provisions).

Ministry of Finance working group is preparing the reform of securities markets legislation. This working group is scheduled to be completed by end of 2010 and the new legislation comes into force in 2011.

However, the current legislation is not going to change substantially. The role of EMV and Financial Supervisory Authority on the regulation of derivative exchanges will remain unchanged.

5.2.3 Sweden

MAD has been implemented in Sweden in law mainly by the Act on Penalties for Market Abuse in the trading of financial instruments and partly by Act (2007:528) on securities markets, Act (2000:1087) on Reporting of certain holdings of financial instruments and Act (1991:980) on Financial Instruments Trading.

In Sweden the Swedish FSA has been appointed as the competent body to ensure that the provisions adopted pursuant to the Directive are applied. According to the Act on security markets the exchange is responsible for making sure that information is freely available and that the players follow the rules. Just like in Denmark, the Swedish Securities Trading Act does not allow delegation of powers to other public authorities and there for the Swedish FSA is the sole competent financial authority.

The implementation of MAD in Sweden goes in some cases further than MAD. The law 2005:377 covers not only the financial instruments admitted to trading on a regulated market, but trading in the securities market in general.

5.2.4 Norway

The Norwegian Securities Trading Act is harmonised with the Market Abuse Directive (Directive 2003/6/EG of 28 January 2003). The Securities Trading Act is regulating financial instruments in general. The Financial Supervisory Authority of Norway has been appointed as the competent body to ensure compliance.

Nord Pool ASA holds a license as a derivatives exchange under the Exchange Act (2000), and is under supervision by the Financial Supervisory Authority of Norway.

Nord Pool Spot AS holds a license to organise the market place for trade in electricity for physical distribution (“Markedsplasskonsesjon”) under the Energy Act (1990) of Norway. Nord Pool Spot is under supervision of the Norwegian Water Resources and Energy Directorate (NVE).

Both Nord Pool ASA and Nord Pool Spot has established sets of rules pertaining to participants that desire to make use of the market place, a so called “rulebook” which contain market conduct rules. These documents contain specific rules to prevent market misconducts for Commodity Transactions and Derivative Transactions, and are harmonised for the two markets.

In addition, misuse of dominant position in general is regulated through the Act on competition between undertakings and control with concentrations and Act concerning implementation and enforcement of the competition rules of the EEA Agreement (the “EEA Competition Act”). The legislation prohibits any abuse by one or more undertakings of a dominant position.

5.3 Market surveillance at Nord Pool

5.3.1 Regulation of Nord Pool ASA

Nord Pool ASA holds a license as a commodity derivatives exchange under the Exchange Act (2000). The license is granted by Ministry of Finance and Nord Pool ASA is under supervision by the Financial Supervisory Authority of Norway, Finanstilsynet.

The clearing house, NASDAQ OMX Stockholm AB holds a license from the Financial Supervisory Authority in Sweden, Finansinspektionen.

Under the (Norwegian) Exchange Act § 27 the exchange is required to establish and maintain a market surveillance function. More detailed regulations regarding the market surveillance has been issued by the Ministry of Finance. (Børsforskriften Chapter 4).

5.3.2 Regulation of Nord Pool Spot AS

Nord Pool Spot AS holds a license (“Markedsplasskonsesjon”) under the Energy Act (2003) of Norway. The license is granted by the Norwegian Water Resources and Energy

Directorate (NVE) to operate an organized marketplace for trade in physically delivered power contracts. Nord Pool Spot is under supervision by the NVE.

The license requires that a market surveillance function is established, and Nord Pool Spot Market Surveillance cooperates with the market surveillance at Nord Pool as a common function.

5.3.3 The market surveillance function

The Exchange Regulation (“børsforskriften”) for Nord Pool ASA and the license given to Nord Pool Spot (“Markedsplasskonsesjon”) regulate what tasks market surveillance department shall perform.

The main task for market surveillance is to monitor the trading activity at Nord Pool ASA and Nord Pool Spot AS in order to detect any possible non-compliance with the Market Conduct Rules. Such trading activity includes orders, trades and reporting of non-exchange trades in the financial market, as well as bidding and trading in the physical market. If there is suspicion of any breach of the Market Conduct Rules, market surveillance shall gather information and investigate according to the proceedings described later in the document.

Market surveillance has an important role in building market confidence, and in this context, performs advisory service towards market participants as to the principal and practical compliance of the trading rules. Further, market surveillance is in close and continuous dialogue with the Nordic Transmission System Operators (TSOs) with respect to their role in the information of trading capacities within the Nordic electricity exchange area.

The main focus area of Nord Pool Spot/Nord Pool’s market surveillance is to monitor the compliance of the Market Conduct Rules and can be divided into four main points.

The two first points deal with market participants' obligations to provide information to the exchange and the market for transparency purposes, and constitute essential fundamentals for any further investigations:

1. Reporting of non-exchange trades – financial market

All market participants shall report to Nord Pool all OTC transactions in a clearing request, that it is a principal or intermediary to. The main rule is that the reporting must take place within 15 minutes, and must contain the correct data of the trade.

This is described in the market conduct rules § 2.

2. Disclosure of inside information – physical and financial market

All market participants shall immediately disclose to Nord Pool Spot/Nord Pool all inside information. This is in general all information which is likely to impact prices in any of the markets.

This is described in the Market Conduct Rules.

The two next points deal with market participants' market conduct and actual trading:

3. Insider trading – physical and financial market

Market participants are prohibited from trading when holding inside information. This is valid until the information has been made public as defined in the rulebook.

4. Market manipulation – physical and financial market

Market participants shall not engage in market manipulation as defined in Norwegian law and the Nord Pool Spot/Nord Pool rulebook. The provisions in the Market Conduct Rules are identical to the provisions of the Market Abuse Directive (MAD).

Nord Pool has established frequently asked questions page on regulatory issues derived from the implementation of the MAD as well as other regulatory issues.

5.3.4 The independency and integrity of market surveillance

Market surveillance has an important role in establishing and maintaining this confidence and integrity by having a strong and visible presence in the market. All information received in connection with investigations and cases handled by market surveillance is treated as strictly confidential and only authorized personnel has access to the department's premises.

According to Børsforskriften Chapter 4, the market surveillance function shall be organized in such manner that it ensures the integrity and independence on the employees of the department.

5.3.5 How market surveillance works

If, during the continuous monitoring market surveillance (MS) finds conduct that appears to be in breach of the market conduct rules, this will be further investigated

If this is not dismissed after initial clarification, a case will be opened. MS will continue investigations, asking for data from the relevant market participant(s), and if relevant, other parties or authorities such as Transmission System Operators (TSOs).

If the suspicion cannot be invalidated a report will be sent to the relevant supervisory authority (Finanstilsynet, NVE or both).

If any investigations lead to the conclusion of a performed breach on the market conduct rules at the financial market, the case will be brought forward to the Disciplinary committee, that will make recommendations to the Nord Pool ASA Board of Directors as to the level of possible sanctions. Any sanction made by the board will then be published.

If investigations lead to the conclusion of a performed breach on the trading rules at the physical market the decision as to issue sanctions will be made by the CEO of Nord Pool Spot. Any sanction will also be made public.

Any sanctions in form of a violation charge issued by Nord Pool ASA can be appealed to the Exchange Appeal Board, which is a publicly appointed and independent appeal body for exchanges' administrative decisions, common to all Norwegian exchanges and regulated market places.

5.3.6 Breaches with the market conduct rules

An investigation that concludes that a Nord Pool member has violated the Market Conduct Rules can be sanctioned by Nord Pool ASA and/or Nord Pool Spot, by issuing either:

- an oral warning,
- a warning in writing,
- a violation charge on the market participant of up to NOK 2,500,000.

In cases where the market participant does not comply with the duty to provide information on request by Nord Pool in relation to investigations, Nord Pool ASA and Nord Pool Spot may impose a daily charge until the information is provided.

5.3.7 Breaches with national law

If an investigation concludes that the suspicion cannot be invalidated a report will be sent to either of the two relevant supervisory authorities, Finanstilsynet and NVE, or both. Market surveillance may also report findings to other Norwegian authorities, such the Competition Authority. Upon such findings or conclusions which involve market participants located in other countries than Norway the supervisory authority may report such findings to relevant authorities in the respective country. Market surveillance may address these relevant authorities directly, but only with the consent from Finanstilsynet or NVE.

Authorities located outside Norway may ask market surveillance at Nord Pool to conduct investigations of named Nord Pool members by addressing such request through the relevant Norwegian supervisory authority.

5.3.8 Nasdaq OMX acquires the shares in Nord Pool ASA

A decision has been taken by the owners of Nord Pool ASA to sell their shares to Nasdaq OMX.

According to available information, the transaction is only related to the *ownership* of the shares of Nord Pool ASA, which will continue to be a Norwegian company. Thus Nord Pool ASA will continue to operate under a licence from the Norwegian ministry of finance. The license and the market surveillance are regulated through Norwegian law and it is anticipated that Market Surveillance also in the future will report to the Norwegian Kredittilsynet. On the other hand, Nasdaq OMX has its own Market Surveillance, and changes may be considered. It is important that NordREG follows the development of market surveillance. The present market surveillance has a unique strength inasmuch that it can follow behaviour both in the Spot and financial markets and even, under certain conditions, on the balancing market.

6 Interviews with market players

Interviews with 13 market players have been one important input for the assessment of how well the financial market facilitates an effective and well-functioning Nordic electricity market. Parts of the interviews have focused on present and possible risks in the Nordic electricity market and how these risks are managed. Another focus has been on possible problems in the supply of demanded financial contracts and if there are features or structures in the market that prevent demanded instruments to be supplied. Comparisons with other commodity markets have also been asked for.

The aim with the interviews has been to get qualitative input to the description and analysis of the financial market. The aim has not been to get quantitative conclusions regarding the views of percentages of market players. A prerequisite for quantitative conclusions would have been a questionnaire to a much broader sample.

The interviewed market players come from Denmark, Finland, Norway, Sweden, Germany and the United Kingdom and they represent different categories such as customers, retailers, producers, portfolio administrators, banks and trading companies. Most of the interviews have been performed by the consultant but some have been performed by members of the TF.

6.1 Price risk management

All interviewed market players are satisfied with the possibilities for price risk management which are given by the base-load system price contracts. The system price risk is the most important risk and the risk that necessitates the most careful risk management. New risks do not arise provided that it is understood that system price contracts can only manage the system price risk – not the area price risk.

Most customers and producers are focused on a hedge of budgeted electricity prices for the present year and perhaps some coming years. One common strategy is to gradually establish the hedging position according to plan during a defined period of time (one or several years before the consumption or production year). Such a strategy means that the hedged price will be an average of the financial prices during the defined build-up period. The alternative for a customer to enter into a fixed-price retail contract has the disadvantage that the electricity cost will be totally dependent on the prevailing financial prices when the contract is signed.

An alternative hedging strategy chosen by some customers and producers is to make “case-by-case hedges” when the financial prices are seen as advantageous. This strategy can in some situations be more profitable than hedging according to plan but can of course in other situations cause losses.

Retailers face a price risk when they sell a fixed-price contract and execute normally back-to-back hedging of fixed-price contracts as soon as the contracts are sold. The profit margin for a retailer is so small in relation to the price risk that the profit margin can quickly disappear if the price risk is not hedged.

Options are mentioned by some market players as interesting to include in a strategy for price risk management. However, these players point out that the volatility during the last

years have increased option premiums to levels that make options difficult to use for other purposes than trading purposes.

Base-load system price contracts are listed by Nord Pool for five calendar years after the present year. One customer emphasizes that some industries need at least 10-year contracts in order to hedge the profitability of new investments in electricity-intensive processes. Such contracts have now to be done as bilateral physical contracts. A producer can have a corresponding interest in a long-term contract if it plans a new investment.

Some market players point out that there are special rules in Denmark and Norway that make it risky for Danish customers and Norwegian producers to hedge the same percentage as is feasible in other countries from a risk management perspective.

It is noted in one interview that consumers in Denmark have to understand that their costs for the feed-in tariff for offshore wind and older onshore wind are related to the spot price and that the rules include an ex-post adjustment of the network tariff to enable an exact recovery of these costs. A Danish customer who buys all his consumption on fixed price or hedges all his consumption will therefore be “overhedged” and face a new price risk related to its network tariff.

Norway has a property tax on hydro power plants which is dependent on the average spot price during the year. A high spot price results in a higher property tax and a low spot price results in a lower property tax. The property tax rules result thus in a partial hedge of the price risk for Norwegian hydro power producers. A Norwegian producer risks therefore to be “overhedged” if it hedges its expected hydro power production to the same extent as hydro power producers do in other countries.

Exchange-listed companies shall follow standards by the International Accounting Standards Board (IASB). Changes in fair value of financial instruments shall be recognised in the profit and loss account. However, hedge accounting of contracts is eligible according to the standards if some conditions are met. The advantage of hedge accounting instead of trade accounting is that a change in the fair value of the hedging instrument has not to be included in the profit and loss account but it shall be included in the changes of equity statement in the balance sheet. An alternative to hedging by derivative instruments is to include clauses that enable hedges in the retail contract with the physical supplier. Fixed-price agreements with a physical supplier do not meet the IASB definition of a financial instrument and such hedges will thus not affect the financial statements of the company before the delivery period. Some companies choose for this reason to make hedges with their physical supplier instead of acquiring derivatives in the financial market.

6.2 Area price risk management

The spot market is a common auction for the Nordic countries but the market is divided into different bid areas. Presently there are five bid areas in Norway, two in Denmark and one in Finland respectively Sweden. Sweden will during the second half of 2011 be divided into four bidding areas. Congestions between different areas can result in different area prices. Nord Pool Spot calculates also a Nordic system price for each hour. The system price states the common Nordic price that would have been achieved with

only one bid area for the whole Nordic area. This means that there is also an area price risk for the Nordic market players in addition to the system price risk.

The area price risk can be managed by either exchange-listed CfD-contracts or bilateral area price contracts. CfD-contracts refer to the difference in EUR/MWh between an area price and the Nordic system price. Bilateral area price contracts refer normally to the area price in the local currency. Such contracts are not traded on the exchange and are therefore not possible to clear. One advantage with CfD-contracts is that they do not reduce the liquidity in system price contracts since the basic hedge is still in system price contracts. Another advantage is that the variations in EUR/MWh are less for area price differences than for the area prices (since there is normally a correlation between area prices and the system price). Possible extra risks because of defective liquidity are therefore lower for CfD-contracts than for area price contracts.

The “insurance premium” for CfD-contracts or bilateral area price contracts is by many seen as too high in relation to the expected magnitude of the area price risk. The area price risk is in many cases therefore not removed and is instead kept by the market player.

The market share for fixed-price retail contracts is in Norway much lower than in the other Nordic countries. Norwegian retailers have therefore less need for area price risk management than retailers in the other countries. Retailers in South Norway have also less incentive to hedge the area price since they often expect the area price to be lower than the system price.

6.3 Volume risk management and profile risk management

There is by definition always a mismatch between the fluctuating demand of a customer and the hedge which is possible with base-load contracts. This mismatch can be reduced with the use of peak-load contracts, bilateral structured products or bilateral retail contracts that allow volume deviations.

The turnover in exchange-listed peak-load contracts is high in the German market but is negligible in the Nordic market. Bilateral peak-load area price contracts are traded in Denmark.

There are also structured products that are supplied by some companies. Danish district heating plants have e.g. a possibility to hedge electricity generation on the basis of heat demand. However, structured products that match the fluctuating demand of a customer are most often very illiquid and therefore often not seen as competitive by the customer.

Most market players use no other tools for volume risk management than careful planning and follow-up of deviations. The profile risk is so far not seen as an important issue. Some players say that they would prefer to use peak-load products but that such products are too illiquid. Some regret that Nord Pool chose the German peak-load definition when the peak-load contract was introduced three years ago. Hour 07-08 is e.g. defined as an off-peak hour while it is in reality a peak hour in weekdays in the Nordic market with respect to consumption and prices.

Most market players believe that the interest in peak-load contracts will increase when more wind power and increased trade with the continent result in increased differences between peak prices and off-peak prices.

6.4 New risks related to financial trading and financial hedging

Financial trading and financial hedging means that new tools are used. Process risks and data system risks arise. The new tools have also to be fully understood in order to understand the total risk of the company. One mentioned example is that the Stockholm CfD-contract refers formally to the bid area which includes Stockholm but has been used in all Sweden for area price risk management. The coming division of Sweden into four different bid areas will thus mean that concluded CfD-contracts can refer to another area than originally intended.

Counter party risks have also to be understood. Many companies have as a rule that all bilateral contracts that can be cleared shall be cleared. Other companies accept un-cleared trade with counter parties that are accepted by the treasury of the company.

Financial trading and financial hedging can also result in unexpected capital risks. Big price movements can result in so high margin calls from the clearing house that the positions have to be reduced even if the price movement is positive for the profitability of the company. The general capital crisis last year resulted in an increased awareness and focus on capital risks and liquidity risks related to financial trading and financial hedging. One trader mentions as an advantage with buying options that there is no risk for extra losses in addition to the price of the option that is paid when the option is bought. Buying options can therefore not result in extra margin calls and is thus less cash sensitive than trading in normal forward contracts.

Several market players mention that sudden price spikes in Elspot result not only in massive transfer of wealth in the spot market but can also give significant increases in the financial contract prices for future periods.

Some market players are concerned that Nordic financial authorities give no priority to the supervision of financial electricity market and see risks for future problems with insider trading and market manipulation.

6.5 Problems in the supply of demanded instruments?

It is noted that it is always possible to make a trade through the exchange since there are market makers in all Nordic contracts (except Oslo CfD-contracts). However, some products are seen to have maximum spread and minimum volume in the quotations.

Several market players state that there is a liquidity problem in the supply of peak-load contracts and CfD contracts. They see asymmetric interests in the buying side and the selling side of CfD-contracts. The areas are seen as too small for a real market to develop. The present uncertainty regarding division of Sweden is also seen as impeding the trade in CfD-contracts.

Some traders state on the other hand that customers and retailers have also a responsibility for the liquidity of a contract. A supply from traders cannot be expected if customers and retailers have not expressed in the market a willingness to buy. Customers and retailers can also reduce the risk of extreme price spikes if they include demand reductions at high prices in their bids to the spot market. These traders mean that such a reduced risk for extremes price spikes in peak hours facilitate for traders to take positions in peak-load contracts and CfD-contracts.

The liquidity of long-term contracts for year 3-5 is not the same as for year 1-2 but this is not seen as a major problem. Some players have noticed a significant improvement in the liquidity of long-term contracts during the last years. It is not a general wish in the market that the exchange shall list standardized contracts with longer maturity than 5 years. Even longer contracts give extra risks and can require special clauses which are only possible to include in a bilateral physical contract.

Some market players see Asian-style options (the settlement price depends on the average of the spot prices during the delivery period) as good instruments in a risk management strategy. There are some bilateral trades in Asian-style options but they are not frequent. It is also pointed out that Asian-style options with a high strike price can be used as capacity options. However, the present demand in the Nordic market for such options is not seen as enough to propose that the existing listing of European-style options shall be extended with listing of Asian-style options.

Some traders stress the importance that the liquidity is not spread among too many products and that this aspect is carefully assessed before introduction of new products. However, nobody has raised a proposal to delist any of the existing products.

6.6 Proposed alternative solutions

Many market players express concerns regarding the area prices in the spot market. There are diverging views regarding the present division of the Nordic market into bid areas and the coming division of Sweden into four bid areas. All the players see the Nordic physical market as well-functioning without market power when it is one common market without congestions between bid areas. However, the market is by many seen as less well-functioning with potential market power when there are congestions and the market is split into different price areas.

Some market players propose a review of the pricing rules for area price spikes. It is pointed out that the four hours in December 2009 and January 2010 with 1 000 EUR/MWh or more in spot prices for the areas Finland, Sweden, Eastern Denmark and the two northern areas in Norway got prices for regulation power that were only about 5 % of the spot prices.

Some players question why use in the spot market of the TSO-contracted capacity reserve shall be priced at the level of the highest commercial bid to the spot market and therefore give such a transfer of money from customers to producers. One proposal is that the TSO-contracted capacity reserve shall always be bid into the spot market at predetermined prices that reflect marginal costs and start-up costs. It is also questioned that TSOs shall be allowed to reduce external trading capacities to 0 MW because of internal bottlenecks.

One market player proposes that the costs for price area differences shall be covered by a variable part of the network tariff which can be differentiated between the different areas.

Some players want a discussion regarding the technical price limits in the spot market. One proposal is to have a lower price ceiling on separate area prices than the technical price limit on the system price or to have a ceiling on the maximum difference between an area price and the system price. One market player states that it is better for the market that a possible pro rata curtailment of spot bids is handled in the Elbas market or bilaterally than with extreme price spikes in the Elspot market on the total consumption in an area.

One trader sees Financial Transmission Rights (FTR) as interesting for the market. Other market players who comment FTR believe that they can be interesting for trading companies but say that it is not shown that FTR will give a better total market. Some say that FTR is a completely wrong way for the Nordic market. The present focus on transit arrangements in Continental markets should be decreased and not increased by a changed market design. The focus should instead be on the development of market coupling. There is also a worry that FTR will mean a segmentation of the Nordic financial market into several area price contracts instead of the present combination of system price contracts and CfD-contracts.

There is a wish from some market players that stricter reporting demands on brokers and uncleared bilateral trade shall be imposed. Some players wish better transparency regarding coal storages and reservoir content in different rivers. One trader proposes that the Nordic market shall close later in the afternoon in order to facilitate spread trading with other commodity markets which close later.

There is a wish from many market players that the financial authorities shall give priority to the supervision of the financial electricity market. Reports of possible insider trading or market manipulation have to be investigated in order to keep the trust in the market. Some market players wish that the competition authorities shall pay more attention to market power problems in situations with separate price areas.

6.7 Comparison with other commodity markets

All market players are satisfied or very satisfied with the general functioning of the Nordic financial electricity market. There are many players in the market with different trading approaches and different hedging needs. The market is seen as very transparent and a high share of the contracts is traded electronically. The linkage to the physical market is seen as well-functioning and makes efficient pricing and symmetric information possible. However, the market players have not full trust in the prices when the market is divided into separate price areas. High barriers for new baseload physical production and the low bidding of demand elasticity into the spot market are also mentioned as problems in the physical market.

The financial settlement during the delivery period is seen by many as a real strength for the Nordic financial electricity market. Traders do not have to be concerned about transit arrangements, nominations and other operational issues as in many other markets. Customers and retailers can easily have separate hedging positions related to their physical contracts also during the delivery period.

The market power of key players is seen as lower in the Nordic financial electricity market than in other European financial electricity markets. Most of the trade is done through the exchange or through clearing-linked brokers and the short-term price fluctuations are thus transparent in an equal way for the whole market. Short-term price fluctuations are more difficult to follow for normal players in other markets since the share of bilateral trade is higher and there is less transparency. This is seen to lead to arbitrage opportunities, higher liquidity premiums, market dominance etc.

The function of other electricity markets is seen as improving with better transparency. Some traders point out that an important driver for the increased volumes in other financial electricity markets is increased cross-commodity trading. The prices in the Nordic electricity market are not as affected as the German or the UK electricity markets by changed prices on coal, gas and emission rights. This makes the latter electricity markets more attractive than the Nordic market for traders and investors who want to focus on cross-commodity trading.

7 Inputs from the workshop

As a step in the work towards completing the task a workshop was arranged on the 1st of June at Arlanda. The purpose with the workshop was to discuss the preliminary conclusions of the report with stakeholders and to obtain their views on the Nordic financial market.

During the workshop the participants were divided into three discussion groups. One group consisted of participants from government agencies and two groups in which the remaining participants were divided randomly. In the following are some conclusions and highlights from the summarized discussions at the workshop.

The basic views from the government agencies were that the Nordic financial electricity market is functioning well, even if there is always room for improvement.

In the following are comments from the groups with market players.

The first question that was discussed was which criteria are most relevant when assessing the efficiency of the Nordic financial electricity market. According to the group discussions; transparency, transactions costs, liquidity and number of players are the most important criterias.

The groups were also asked to comment on strengths and weaknesses in the Nordic financial electricity market. The groups thought that one of the greatest strengths of the market is that in general there is good liquidity, a large number of active participants, good transparency and a well functioning market surveillance at Nord Pool.

One of the groups was more specific and stated that the well identified market rules, strong reference price, one common trading platform and sufficient underlying consumption as well as physical volume and market size are important strengths. They thought that UMMs are a good tool for equal access to market information for participants and that the Nordic wholesale market can be regarded as one market with a high combined consumption.

The areas in which the group found room for improvement were low liquidity in longer term contracts and CfD contracts and the lack of contracts longer than 5 years listed on the exchange. Generally the view was expressed that too many illiquid products were listed and that the cost of entry was too high.

During the discussions one group also expressed that the penalties for breaking the Market conduct rules may not be high enough and that a clarification on how and when TSOs should publish UMMs on capacity is needed.

One of the groups expressed that there are political risks and their impact on the market was also taken into account in the assessment of the market. Furthermore the need for more interconnector capacity was stressed.

During the discussions further ideas on how to improve the Nordic financial market was mentioned:

- Lower barriers to become a market maker for financial products
- Could TSOs be a market maker in the CfD market?

- Improve cross-border capacity investments in order to mitigate/reduce bottlenecks between the physical market areas
- More clear rules for UMM
- Concentrate liquidity to few products

As a final question the groups were asked if there are any financial products that are not offered on the market today but should be in the future. One group discussed the possible introduction of financial transmission rights on the Nordic market but there were no clear recommendations from the group.

Another group wanted the Nordic market to develop more into a commodity exchange which would offer “the whole value chain”, fuels, CO2 certificates, power etc. They also suggested new CfD products and a new way of handling the price difference due to different bidding areas.

Overall, the market participants at the workshop expressed that the Nordic financial electricity market is efficient. There were also ideas and suggestions of improvements.

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9 Appendix

9.1 Glossary

Area prices:

The total spot market area is divided into bidding areas; these may become separate price areas if the contractual flow of power between bid areas exceeds the capacity allocated for Elspot contracts by the transmission system operators. When such grid congestion develops, two or more area prices are created

Bidding area:

The bidding area is the area for which a bid to the spot market is posted. In order to handle grid congestions the Nordic exchange area is geographically divided into bidding areas. There are at least six bidding areas in the Nordic exchange area: Sweden, Finland, Denmark East, Denmark West, and at least two Norwegian areas. Norway is presently divided into five bidding areas. From the 1st of November 2011 Sweden will be divided into four bidding areas.

Churn rate

The churn rate is a measure of liquidity based on how many times a good or product is sold and re-sold before consumption. It is typically measured by the volume traded as a multiple of the underlying consumption level, or other measure of physical output. For example, a churn rate of 3 would mean that on average each product would have been sold three times and then re-sold twice before being consumed.

CfD:

Contracts of difference is a type of contract that is used to hedge against area price differences. A CfD-contract refers to the price difference in EUR/MWh between an area price and the system price. Price differences arise between different areas in the Nordic countries due to limitations in transmission capacity between different areas.

Clearing

The process whereby the clearing house enters into a trade as central counterparty to both the initial buyer and seller. All trade on an exchange is cleared.

Clearing house

A clearing house is an organisation which clears contracts and guarantees the performance and settlement of futures and options contracts. The clearing house is the third party that becomes the counterparty to both buyer and seller to reduce counterparty risk. A clearing house has to have a strong financial position and a well regulated system to manage counterparty risks.

Clearing client:

A clearing client is an entity that has been approved by the clearing house to have its trades subject to clearing through a client representative. The client representative

perform the trading on behalf of the clearing client, but the clearing client is itself liable for the guarantees and settlement towards the clearing house.

Clearing and exchange member:

A clearing and exchange member is a market participant that has been approved by the exchange and the clearing house to perform trades on the exchange and have its trades subject to clearing with the clearing house.

Client representative:

A client representative has entered into agreements with the exchange and the clearing house to trade on the exchange on behalf of clearing clients and may also trade on its own account.

Counterparty

Each participant in a trade is counterparty to the other participant – the buyer to a seller and the seller to a buyer.

Counterparty risk

The risk that a counterparty to a contract defaults and does not fulfil its obligations.

Credit risk

Credit risk is the risk of a party defaulting on a payment where they have been given credit.

Derivatives:

Derivatives are financial instruments whose characteristics and value depend upon the characteristics and value of an underlying product. All the derivatives that are traded on Nord Pool have Nord Pool spot prices as the underlying product, except for the options which has forwards as the underlying product. Settlement of derivatives on Nord Pool is financial, i.e. without physical delivery.

The derivatives that are traded at Nord Pool's financial market are Nordic, German and Dutch power derivatives, European Union allowances (EUA) and certified emission reductions (CER).

Elspot:

Elspot is the physical day-ahead market at Nord Pool Spot for the Nordic area.

Elbas:

Elbas is the Physical Intra Day power market at Nord Pool Spot which is currently available in Finland, Sweden, Denmark and Germany. Trading can be conducted up to one hour before delivery.

EEX

European Energy Exchange based in Leipzig, Germany.

Hedging

Hedging is an action taken by a buyer or seller to protect their business or assets against changes in prices. In the electricity market this often involves trading forward products to lock in future prices. This reduces the exposure to short term price movements.

Implicit capacity auction:

The day-ahead transmission capacity is used to integrate the spot markets in the different bidding areas in order to maximize the overall social welfare in both (or more) markets. The transmission capacity between bidding areas is made available to the spot price mechanism operated by the power exchanges. The resulting prices per area reflect both the cost of energy in each internal bidding area (price area) and the cost of congestion. Implicit auctions ensure that electricity flows from the surplus areas (low price areas) towards the deficit areas (high price areas) thus also leading to price convergence.

MAD:

Market Abuse Directive

Market maker:

A market maker is a member who commits to continuously quote buy and sell prices on the exchange.

MiFID:

Markets in Financial Instruments Directive

Option:

An option is a right to buy or sell a commodity at a predetermined date at a predetermined price. The seller of an option gives the buyer the right, but not the obligation, to buy or sell an underlying commodity in the future for a specified price. Basically there are three types of options, European, American and Asian style options. Nord Pool offers European style options.

A European option may only be exercised on its expiration date. An American option, in comparison, may be exercised at any time before and up to its expiration date. The payoff of the European and American option depends on the average price of the underlying asset on a specific date and not over a period. The payoff of an Asian option is based on the average price of the underlying asset on a specific set of dates over a period and not on a single date.

OTC:

An Over The Counter (OTC) market is any market which does not work through an exchange-based system. It includes trading which is negotiated via OTC brokers.

Spread of bids

The spread of bids indicates the difference between the price quoted for an immediate sale and an immediate purchase. It is often used as a measure of liquidity; a smaller bid spread indicates a higher level of liquidity.

System price:

Nord Pool Spot calculates a Nordic system price for each hour. The system price states the common Nordic price that would have been achieved with no congestions within the Nordic area.

TSO:

Transmission System Operator (TSO) in the Nordic area is Fingrid (Finland), Energinet.dk (Denmark), Svenska Kraftnät (Sweden) and Statnett (Norway). The TSOs are responsible for the system operation and the transmission networks within their areas.

UMM:

Participants are required to send Urgent Market Messages (UMM) to Nord Pool Spot regarding changes in facilities for production, consumption or transmission.

9.2 Questions from the interviews

1. Present risks in the business that is related to electricity prices and are desirable for risk management?
2. To what extent can the present risks be mitigated with financial trading?
3. How do you deal with risk within the company?
4. Have the development of the financial market engendered new risks for the market participants?
5. Views regarding the functioning of the Nordic financial electricity market?
6. Are there any differences between the Nordic and the European financial electricity markets?
7. Are there any differences between the Nordic power exchange and other commodity exchanges?
8. Your understanding regarding cfd, peak load contracts, contracts with long-term maturity and capacity options?
9. Is there anything in the feature or the structure of the electricity market that negatively affect the supply of financial instruments?
10. Is there anything in the feature or the structure of the electricity market that negatively affect already available financial instruments?



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